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EDMUND RUFFIN, EDITOR AND PROPRIETOR.

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ECONOMY AND MANAGEMENT OF BEES.

Translated from the "Cours Complet d'Agriculture, etc. par l'Abbe Rozier et autres."

This article is compiled from the works of the best authors, who have not only written concerning bees, but also have observed their habits, taken care of them, and made numerous experiments in their management. These authors are Swammerdam, Maraldy, Reaumur, Mill (or Wildman,) Schirach, Bonnet, Riems, Hattorf, Needam, the two Hubers, and others: and to the information derived from all these sources I have to add the results of my own experience for eighteen years, during which my attention has been given to this subject.

CHAPTER I.

Of the Different Species of Bees.

There are many species of bees, as the *wood borer*, the *tapestry bee*, the *carder*, the *leaf cutter*, the *mason bee*, &c. all of which are wild and solitary, and whose industry, however admirable, cannot be made beneficial to man. These will not be treated of in this article, which will be devoted to the *honey bee*.

The bees which fabricate wax and store up honey, live in societies formed of numerous individuals, and labor in common. These societies are independent of each other, have no connexion or intercourse, and form so many separate monarchies, as they may be called, since in each, a single chief directs all the members of the society. This chief is a female, and has been called the *queen*. There are also from fifteen hundred to two thousand males, called *drones*, which do not labor, and live only about two months; and innumerable bees of a smaller size, called *working bees*, which perform all the labors required for the society.

Many authors maintain that there are in Europe four species of honey bees; but they all agree that the kind to be preferred is the smallest, which is commonly called the *little Dutch bee*: I know no other than this, which is the kind that is most common.

There is in each community only one queen, from fifteen hundred to two thousand drones or males, and the working bees, which are of the feminine sex, but in which nature has not permitted the developement of the ovary, except in the case of their receiving a particular kind of nourishment during their earliest existence. That is so true, that when the working bees lose their queen, they procure for themselves another—and there are even some of them that lay, but so imperfectly, that their eggs produce males only.

The queen has the body longer than the wings; she is heavy [and sluggish] in the time of her principal laying of eggs for working bees—drags herself along with difficulty when she begins the laying of drones—is light and brisk when this laying is finished, and is in a state to conduct the first swarm from the hive, as we shall describe. She does not labor—and has a sting.

The drone has large wings: he is twice as heavy as the working bee. He is black, and has the extremity of the body very hairy: he does not labor—is without a sting—and exhales a very strong odour, which in the time of the swarms, is perceived near the hive.

The working bee is small, brown, and covered with hairs; its wings are as long as its body. The young ones have a white point at the extremity of the belly; those of a year old are more brown, have the white spot effaced, their wings fringed, have stings, and on the two hinder legs have a little cavity or hollow, in which they bring the *pollen* which they gather from flowers.

CHAPTER II.

Destination of the Queen Bees, Drones, and Working Bees.

The queen bees people their hives without cessation, except during the time of cold weather, when their laying is suspended. Their principal laying takes place in the spring. The number of eggs, annually layed by each queen, may be estimated at from fifty to sixty thousand; hence proceed those innumerable swarms which perpetuate the race of bees.

The presence of a queen is absolutely necessary in every hive. They have so great an aversion to each other, that there cannot be two in one hive, without their fighting until one of them is killed.

The vigilance of the queen is such, that if you strike the hive even moderately, she runs immediately to the place inside, where she has heard the noise, as if to learn the cause of it.

The drones are destined solely to impregnate the queens. They first appear at the end of April, and do not go out except in the finest weather, to fly about the hive from mid-day to three or four o'clock.

In July and August, after the young queens have been impregnated, the males are driven from all the hives, and exterminated by the working bees: not one is left; and the bees, after having killed them, drag their bodies out of the hive. If drones are seen in any hive after this general destruction by the working bees, it is an indication that the hive is in a declining state.

The working bees are charged with all the labors of the community. They go to search for the materials necessary to coustruct their edifices, which are of wax and divided into *combs*, lying parallel to each other. The combs are composed of little boxes or cavities that are called *cells*. The working bees alone construct them, and repair them when they need it. They gather honey for their common subsistence, and pollen for the young bees. They keep the hive clean, and the air pure by throwing out the bodies of dead bees. They guard the entrance of the hive, in order that no enemies may gain access. If the queen dies, and the working bees cannot replace her, the hive is given up to pillage. The proprietor who perceives it, from

the signs which we shall indicate, ought to provide the remedy of which we shall speak, or carry off the hive for the purpose of saving what remains.

CHAPTER III.

The Reproduction of Bees.

The queen bee is impregnated by meeting with the male abroad, in the open air. It is thus with all flying insects. She can receive the male from the next day after first leaving the cell in which she was hatched; and that her laying may be good, her meeting with the male ought to take place within the first twenty days after her coming out.

Forty-six hours after having been impregnated, the queen begins her laying, with eggs which are to produce working bees. This laying continues about eleven months, including the time when it is slackened and even suspended by the cold. In the eleventh month she commences laying eggs from which the drones will come. As soon as the workers see that their queen is laying male eggs, they prepare royal cells, in which the queen deposits the eggs which are to give existence to young queens. That being done, the annual laying of the queen is finished; she is light, can fly easily, and will depart with the first swarm to go elsewhere to recommence her annual laying.

The queen may receive the male after the first twenty days from her leaving her cell; and she also lays in forty-six hours after. But then her laying is vitiated, and all her eggs will produce males. In a few months after, the working bees will desert this queen, unable to perpetuate the hive. Fortunately such cases are rare.

We call a *brood* the eggs laid by the queen in the cells, and all the *larvæ* which are produced from them. From the egg, a worm hatches, which soon changes to a white bee, which is called *nympha*—and which by degrees takes the color and appearance of the bees which we see. In fine weather, the working bee is formed and can take its flight in twenty-three days from the laying of the egg: the male can take his flight on the twenty-seventh day, and the young queens on the sixteenth.

The brood is at the centre of the hive, which is the hottest place; and the bees cluster there to increase the heat to the degree necessary for hatching the eggs.

One or two years is the term of life for the working bees. The queens, less exposed to the inclemency of the weather, live longer; but all are renewed continually by the prodigious fecundity of the queens. Hives (or single societies) have lasted twenty and thirty years.

CHAPTER IV.

Of the Sting of the Bee.

The little point which we see at the extremity of the body of the bee, and which is so slender and delicate to the eye, is a little case which serves as a sheath for the sting. Towards the top, at its root, is the bag of poison, small portions of which the bee darts through the hollow sheath. The stinging of the bee is almost always fatal to itself, by the sting being left in the wound it inflicts, and a portion of the intestines being torn away with it, which causes certain death to the bee.

If the stinging of the bees is feared in visiting the hives, or taking the honey, it is necessary to cover the head with a cap, and to put over that a hood of linen having a mask of woven wire. The hood should descend upon the shoulders, low enough to be confined under the clothes. The hands may be defended by gloves of shaggy wool, lengthened with linen so that they will reach above the elbows, where they should be drawn close and tied securely around the arms.

Many remedies have been prescribed for the stinging of bees, but I know of only two that will serve: these are alkali and quick lime, either of which will penetrate into the wound, and burn or neutralize the poison. If we have neither alkali nor quicklime, there is no surer remedy than to draw out the sting, squeeze the wound to force out the poison, and wash the place with cold water.

CHAPTER V.

Of the Substances found in the Hives of Bees.

These are honey, wax, pollen and propolis.*

[Honey is an element of all vegetables; it is in roots, as carrots, turnips, sweet potatoes, or onions when roasted; in herbaceous stems, as in sugar-cane, maize, and our cereal plants; in the trunk of certain trees, as the ash which yields manna, the larch which also yields the manna called that of *Briancon*, the balm trees, &c. Far more abundantly, honey is found in melons, fruits, and in cider and wine, before they have fermented. It exudes from and appears on the leaves of certain trees, upon the shrubs of our hedges, the grass of the meadows, and the ears of growing grain. The excrements of the *vine-fretters* are of honey. Living amidst this universal fluid, the urine of man and other animals is impregnated with it. The bees do not alter the color nor quality of honey; they store it in their hives just as they find it. As the productions of nature are infinitely varied, so the color, consistence and flavor of honey are varied according to the productions of each country.†

The waxen edifices of the bees, or combs, contain innumerable cells, in which the bees store their honey, to serve them for food during the winter and bad weather. When these cells are full of honey, the bees close them with little coverings of wax, and in that manner it is preserved. When the filled combs are taken from the bees, we open the closed cells with the blade of a knife, and in that state place the combs on sieves, in order that the honey may flow into vessels placed beneath. The honey which is obtained thus, without expression, is the best that can be made in the country producing it. When the combs are drained, they still retain a little honey, which is separated by pressing the wax of the combs; this honey is inferior in quality to the former.

When we save a certain quantity of honey, it must be done with care, and no bees, nor *larvæ*, should be suffered to be mixed with the honey, as that might give it a bad flavor.

When the dripping of the honey is finished, all of the same quality should be put together in a large vessel which has a hole near the bottom, but which is kept closed. The honey placed in this

* In the original, this chapter contains only these few words. The addition made in the translation is an abridgement of the several distinct articles in the same general work on *honey*, *pollen*, *propolis*, and *wax*.—[Tr.

†In enumerating so much at large the sources whence honey is obtained, it is remarkable that the author should have omitted *flowers*.—[Tr.

vessel throws up to the surface all the foreign matters that it may contain, which will make a kind of froth. At the end of thirty-six hours, the hole at the bottom of the vessel may be opened, so as to draw off the honey into little casks, or jars, in which it is intended to be preserved, and which must be closed immediately. These filled vessels should be put into a place that is cool without being moist, and soon the honey will take such a consistence, that sometimes it causes the breaking of the vessels of earthen-ware which contain it.

Honey is kept easily from one year to another, in cool and dry cellars. If left in a warm place, it would ferment and become sharp; then it is good for nothing but to make vinegar. Honey readily takes the flavor that we may wish to give to it; it suffices to place it in contact with the flowers, the flavor of which is desired. I have seen honey which was said to be of Mahon, and which smelt of the rose, which could not have come from the bees, since they never go upon roses.

Pollen is the seminal powder which is borne by the threads surrounding the pistils which we see in the middle of all the simple flowers; and which the bees, in the season of flowers, continually collect on their legs, and carry to their hives. It was long supposed that the pollen was used by the bees as a material of which to make wax; and it was also believed to serve as food for the grown bees, and in many districts it is called by the name of *bee-bread*. These were errors. It is now fully proved that the bees use the pollen only to make, with honey, a kind of pap for the sustenance of the young brood.

Wax, which is the material for forming the combs, is fabricated by the bees from saccharine matters only, such as honey, sugar, or the sirop of fruits.

The *propolis* is a kind of resin, or gum, of which the bees make use for several purposes. With this material they plaster the interior of their dwelling, and make of it a sort of circumvallation about their edifices. They make use of it to stop the little openings that are not wanting; and also to lessen the size of the entrance of their hive, when they wish to be better sheltered from the injurious influence of the air. They cover with a coat of propolis the bodies of animals that have gotten into the hive, when, after having killed them by stinging, the bees are unable, by uniting their forces, to drag them outside. In this state, the bodies are as if embalmed, and give out no bad odor. It is yet unknown from what sources the bees obtain their propolis.]

CHAPTER VI.

Of Swarms.

Swarms are the bees which leave the mother-hive to seek a new habitation; and each of these swarms is composed of one queen, many drones, and an immense number of working bees.

It is not easy to judge of the number of bees composing a swarm, because the warmer the weather is, the larger the swarm appears when it is attached to the branch of a tree, or other substance on which it has settled; but we may estimate the goodness of the swarm pretty nearly by its weight, as it is known that five thousand bees weigh about one pound. A swarm which weighs only three pounds is inferior; a common one weighs from three to four pounds; and if the weight exceed this, the swarm is a good one. Some swarms, however, weigh as much as six or seven pounds; but these are not desirable, as they exhaust the hive from which they proceed.

A swarm consists both of young and of old bees; and we shall explain here the causes and manner of their *swarming*.

We have said that when the queen has finished her annual laying, she is active and able to fly with ease. At this time, then, which, in our climate is about the end of May, or beginning of June, she should set out with the first swarm, if the weather allows, that she may soon after recommence her laying of working bees.

The queens have an insurmountable aversion for each other; and upon the first sight engage in a battle, which continues until but a single one remains in the hive. As soon as the young queens are formed, or in the state of *nymphæ*, the mother-queen entertains such a horror of them that she seeks to destroy them in their cells. If, then, the season is unsuitable for the issuing of the swarms, either because the laying of the queen has been too much hastened by a mild winter, or the weather still continues cold, the mother-queen destroys the young queens one after the other, and we have few or no swarms. If the weather suits the departure of the swarms, the horror of the mother-queen for the young queens forces her to abandon the hive, carrying with her a great number of the working bees and drones. These compose the first swarm, which is caused in the following manner:

The number of royal cells, which are seen at the same time dispersed in the hive, inspire suddenly in the mother-queen a terror which she cannot overcome; her agitation becomes excessive; she runs about on every side, flapping her wings and jostling the working bees, to which she communicates her own fury. All, then, is in an uproar; and the warmth of the hive, which is generally from 93° to 97° (of Farenheit) rises to 104°. Unable to bear this sudden heat, the bees and the mother-queen rush out of the hive, and thus make the first annual swarm. When the first swarm has set out, the order of the hive changes.

The first of the young queens that comes out of her royal cell, after the departure of the mother-queen, is queen of the hive. The working bees surround the other royal cells and keep a close guard upon them, retaining the rest of the young queens captive in their cells, and feeding them there; while at the same time having no attachment to the reigning queen, who is yet unimpregnated, whenever she attempts to appoach the royal cells they drive her off, bite and harass her. Unable to contain her impatience at the treatment and at the horror with which the royal cells inspire her, the queen becomes excessively agitated, hurries about in every direction, and communicates her own disorder to the bees; the heat rises to 104°, and to escape from it the bees and the young queen desert the hive. Thus is formed the second swarm. The third and fourth swarms are formed in the same way; and when there are no longer bees enough left in the hive to guard the remaining royal cells, the first of the young queens which comes out of her cell after the departure of the second, third, or fourth swarm, exercises her fury without opposition on the royal cells, and the swarming ceases.

It happens sometimes from the disorder which

immediately precedes the departure of each swarm, that some of the captive queens escape from the royal cells, and thus we occasionally see several queens in the same swarm; but we should not hence conclude that more than one queen can continue at liberty in a hive at the same time, for they fight with each other until but one remains. The working bees never interfere in these combats.

Generally, the young queens which head the swarms, go out of the new hives on the day succeeding that on which they are established in them; and in forty-six hours after, they commence laying.

In the months of May and June, when we see the hives full of bees, when the drones go out in the heat of the day, and the weather is fine, it is necessary to watch the hives from eight or nine o'clock in the morning till three or four in the afternoon, that we may observe the departure of the swarms, for fear of losing some of them.

When the swarm issues from the hive, there is no use in the clatter which is commonly made in the country, unless the swarm should be leaving your property: in which case the noise serves to warn the neighbor that you are in pursuit, and gives you the right to take the bees on the land of another, by paying for the damage, if any is occasioned.

If the swarm rises and appears to be going off, we should sprinkle it with water by using the branch of a tree, or cast some dust among the bees; either of these methods will make them settle quickly: they should then be hived and carried away immediately, that, if another swarm should come out, the two may not interfere with each other. As soon as the swarm is in its hive, it may be removed to the place where it is intended to stand.

A hive may give annually four swarms in the space of a month; of these, however, only the two first are usually good, the last are small, and several of them should be united to make one good hive.

When the queen is lost, or removed from the hive, and there remain in it any of the maggots destined to produce working bees, several of these, if not more than three days old, are converted into queen bees by enlarging the cells in which they were deposited, and furnishing them with a particular sort of food, which is done by the working bees. Hence it is easy to conceive how we may procure artificial and early swarms. For this purpose, in the spring, when the drones appear, which is usually at the end of April or the beginning of May, we drive a part of the bees, with their queen, from a full hive into an empty one, which is then removed to the distance of twenty or thirty paces; the full hive is returned to its place, and the bees in it procure another queen in the manner mentioned above.

To drive bees from a full hive into an empty one, there are several simple ways.

The first is to turn a full single hive upside down on the seat of a chair, to fit the mouth of an empty hive upon it and close the aperture between the two with a cloth; then by beating with a couple of sticks on the full hive the bees are driven up into the empty one; and when we judge that the queen has gone up, which is easy to be known by he sou nd which the bees make, the two hives are separated, the new one carried twenty or thirty paces off, and the old one put back in its place.

The second way is to make many little holes in the top of a single hive, to set an empty hive upon it, and drive up the bees and their queen with a little smoke. When this is done the hives are separated, and the holes in the old one stopped up.

The third manner, which is still more simple, is employed with double hives, such as I use, and by means of smoke. How easy this is, we shall see when I speak of the hive that I have adopted.

The swarms should always be moved on the same day that they are *hived*,—and they should be carried in the arms, otherwise, as they have not yet made any combs, they will be shaken and heated, so as to cause the destruction of a great number of the bees. If, however, they cannot be moved on the same day that they swarm, it should not be done till a month after; for this time is required to give solidity to their constructions, which, if moved earlier, would fall, or lose their shape, and put the inhabitants of the hive in disorder.

If the weather should turn cold, the bees of the new swarms having yet no provisions, should be fed with honey or some other sweet food.

CHAPTER VII.

Of the Diseases of Bees.

We know of none of the diseases of bees, with certainly, except the dysentery. That shows itself in the hives during the winter, and most commonly in February or March. The evidence of it is observed in yellow spots about the size of lentils, at the entrance of the hives. Then the hives should be examined, the stands cleaned and sprinkled with a little fine salt; they should be slightly smoked with the fumes of bleached linen or dry cow-dung, and have given them a sirop composed as we shall direct in the calendar, or manual.

The bees are subject to one other malady, surfeit; to prevent this, we should give them nothing outside of the hive in cold weather, for when they are gorged with honey, the cold strikes them and they perish.

CHAPTER VIII.

Of the Enemies of Bees.

The most formidable enemy of the bees is man, who by his ignorance and covetousness, destroys great numbers of them; next to be dreaded is the *wax-moth*, which is known to all owners of bees; but there is reason to believe that this insect never gains ascendency in a hive till it is on the decline; that is, until the activity of the bees has been relaxed, or has entirely ceased, in consequence of the old age or death of their queen at a time when the working bees have not the means of supplying her loss. Every hive in which we see little or no motion and activity, is in danger of being taken possession of by the wax-moth; the hive should be immediately turned up and examined. If on the stand there are black grains like gunpowder, they indicate that the moth has already commenced its ravages; and if upon touching the honey-combs, the working bees do not defend the hive, we may consider it as lost, and take it to save what remains.

The bees have also other enemies; there is a sort of wasp which we should not fail to destroy: and as it is believed that the tit-mouse and even the toad destroys bees, they should be kept away from the hives.

CHAPTER IX.

On Hives.

Fig.1.

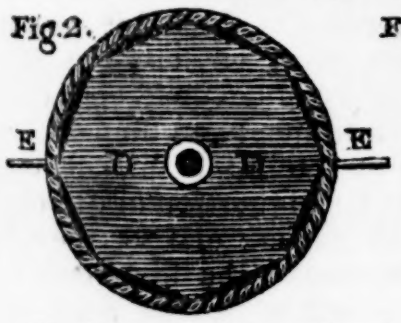

Fig.2.

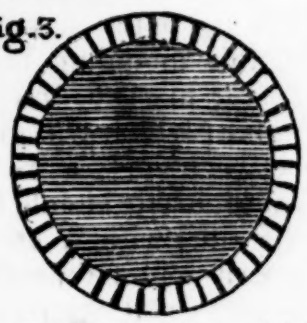

Fig.3.

Each author has maintained that the hive which he has adopted is the best; that in it the bees collect abundant stores and furnish large swarms: in this all have reasoned falsely; the activity of the bees and magnitude of the swarms depend upon nature, and not upon us. On the one side, it is certain that bees work in vessels of any material, and of all forms; and on the other, that the greater or less activity of the working bees depends solely on the fecundity of their queen. This activity is very great if the queen is very fruitful; but if her fecundity is diminished, the labors are also diminished, and they cease entirely if the queen dies at a time when the working bees have not in the hive the means of procuring a new queen, in the manner mentioned in the fifth chapter.

The true point in this matter is to choose a hive easy to rob, with the least injury to the bees. The good management of bees consists in this, and to neglect it is to manage them badly.

The most common hive is an undivided, or single one, in the shape of a bell. This hive being very small, has the inconvenience of being too suddenly heated and cooled; and if made of osier, is subject to a worm called the *artizon*, which gets into the wood and reduces it to dust. With a hive of this sort we cannot get at the purest honey, which the bees always place in the top of the hive. The difficulty of robbing it is the reason that a vast number of bees are destroyed every year, and therefore its form ought to be altered.

Within the last century there have been invented hives of various forms, such as the hoisting hive, the box hive, the drawer hive, &c. &c. The most of these hives being made of plank, are expensive; they lose their shape from exposure to the sun and rain; they require too frequent and too minute attention, and they are not and never will be generally used. Among these hives the first mentioned is the most common among amateurs for amusement; it has, however, one great inconvenience, that of having the top flat, while to render a hive as wholesome as possible the top should be convex. Bees never void any excrement in their hives unless they are sick; and, as during the winter they live on honey and never go out, they must throw off what they make by a considerable perspiration, which rises in vapor to the top of the hives. If the top is flat, the vapors which are collected there, finding no slope, fall back continually on the bees, which are always at the centre of the hive, and cause a collection of moisture which moulds their works and perhaps causes the dysentery, as that disease prevailed particularly in the cold and at the same time wet winter of 1808. The vapors rise also in the same manner in the hives with convex tops, but the water follows the natural inclination of the figure, and the greater part descends along the sides, on their circumference. If it should be very cold, the vapors freeze and hang in ice from the tops of the flat topped hives; these vapors freeze also in the hives with convex tops; but they freeze against the sides of the hives, far from the bees which are at the centre. On this subject I might appeal to the testimony of two owners of bees; first, of M. Guerrapain, who is believed to be the greatest proprietor of bees in all France; I have seen at his place more than nine hundred hives; and of M. Dubost, an officer of the *gendarmerie*, and author of a work upon bees, in which he has established the fact of icicles hanging from the inside of the tops of the flat topped hives.

It will suffice, I think, to give here the description of two kinds of hives: namely, that of M. Huber, which is good for the observation of the habits of bees; and that of which I make use, as believing it the most convenient for taking the honey, and with the least injury to the bees.

[The *leaf*, or *book hive*, is the name given to M. Huber's. It consists of twelve hollow frames, twelve inches high, nine or ten in breadth, and fifteen lines in width, as it is intended each shall receive only a single comb. These twelve frames, laterally applied to each other, form the whole hive. All are connected by means of hinges at the back, so that they divide asunder in opening, like turning over the leaves of a book. The ten intermediate frames between the first and twelth are hollow; the outside of these two are covered; in them also, is an entrance for the bees; there should be one in all the rest, to open at pleasure. On first lodging a swarm in one of these hives, a small piece of comb should be fixed in a division, to guide the direction of those built by the bees, which will be parallel to it; and as each frame contains but a single comb, it is extremely well adapted for observation, and it also admits the removal of that comb, without affecting or deranging the

rest. The whole contents are exposed to view, the queen is easily found, and whatever should be removed or altered, can be selected with great convenience. The inventor conceives that the book hive has the property of rendering the bees more tractable; for on opening any of the divisions, the bees rather testify fear than anger, by retiring into the cells as if to conceal themselves. This he ascribes to the effect which the sudden introduction of light has on them; for they are less tractable after sunset, and during night, than through the day. The divisions must be separated slowly and care observed to avoid wounding the bees.]*

My hive is in two separate parts, (see fig. 1) the body of the hive, (A) and the lid or cover (B.) The body of the hive is made of rolls of straw, each from nine to ten lines thick, wound spirally, and fastened at every inch with a flat band, inclining from left to right, or from right to left, as best suits the hand of the workman.† The diameter, which is one foot clear on the inside, should be uniform in the whole height; and the height of the hives should vary, that we may have them to suit the size of the swarms, and the more or less advanced state of the season. For this purpose we should have hives of the different heights of 13, 14, and 15 inches. At the top and bottom of the hive there should be an exterior roll (C C) made of straw, to give firmness to the seat of the hive upon the stand, and to serve to fix one hive upon another, when necessary, as we shall mention hereafter. At the top of the hive, even, and on a level with the uppermost roll, there is placed a board (D D) made of light wood, of an octagonal shape that there may be openings half an inch wide left between the inside of the hive, and the sides of the octagon.

In the middle of this board there must be a hole, an inch in diameter, to allow the passage of smoke when it is necessary to smoke the bees. The general appearance may be seen in the plate fig. 1, which represents the hive with the top in front. Under this board a flat stick passes through the hive, projecting from 15 to 18 lines (E E) beyond its sides; by this the hive is raised with the two hands, and it serves, besides, to fasten on the lid which has also a projecting stick corresponding with that of the hive, as is seen in the fig. 1. At the bottom of the hive is an aperture two inches wide and six lines high, to allow the bees to pass out and in.

The two first rolls of the lid, (B) making about two inches, have the same diameter as the hive; the third roll is drawn in a little, as are the succeeding ones, making it convex in its elevation, which should not exceed four, or at the most six inches. At the top is left an opening of 15 or 18 lines in diameter, to receive the handle, (F) one foot long, tapering gradually in its visible height, which is only 10 inches, the rest being confined in the straw of the lid, by a pin 5 or 6 lines thick.

To keep the handle in its place, and prevent its being driven down by the weight of the outside covering, (of which we shall speak presently,) another pin is fixed which rests upon the lid, and is at right angles with the former.

The bottom of the lid, at about 8 lines from the edge, is crossed by a flat projecting stick, the use of which has been already intimated. We have said that the lids should not exceeds six inches in height; but it is necessary to have them of different heights, between 4 and 6 inches, to suit the swarms and the seasons, as was observed when speaking of the hives. Finally, there should be placed in the interior of the hive two sticks, the one about three or four inches below the other; they should be crossed, that they may the better support the combs of honey and wax; and one end of each should project a little beyond the outside of the hive, that they may be pulled out with pincers when we wish to rob the hive.

All the hives and the bottoms of all the lids ought to have exactly the same diameter, of one foot clear, within, that one hive may, occasionally, be put upon another, and the lids indifferently upon any of the hives.

To preserve this invariable diameter, a frame is necessary, which any turner can make by the following directions:

A piece of plank (walnut is preferable) of about 2 inches thick and 14 inches in diameter, should be turned on the lathe and reduced to the diameter of 13 inches and 8 lines, (fig. 3.) It should then be hollowing out an inch deep, leaving at the circumference an edge or rim 10 lines wide, which will leave the diameter of the hollowed part just a foot.

A moulding should then be put both on the inner and outer circumference of the rim;* for want of this moulding there must be forty-two *equal* spaces marked, [on the outer circumference of the frame] which will give rather more than an inch between each mark; at the mark dividing each space, a hole should be bored [horizontally through the rim] with a small gimlet; and as the stick which will be used to make the first round (of straw) upon the frame will be flat, we must pass through each hole a small flat piece of red-hot iron, about 2 or 3 lines wide.

On the rim of 10 lines, there must be made 42 grooves, 2 lines wide and of the same depth, at equidistant intervals; these grooves upon the rim should be made between every two holes. The frame is now ready to guide us in beginning the hives as will be presently directed.

The hives should be made of rye straw, as the most flexible, the heads should be cut off with a knife, and it should be beaten to render it more supple; it is never moistened.

We may make use of any sort of flexible wood to tie the straw,—as some species of bramble, split osier, &c. These should be steeped in water for twenty-four hours before they are used.

The hive is begun on the rim of the frame, tying but little straw at first, and increasing it successively at each wrapping of the band until the seventh or eighth, at which it should have attained the full size of the roll. The withe, or band, ought to enter the holes on the inner circumference of the frame,

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* The foregoing description of the book hive, has been taken from the Edinburgh Encyclopædia, it being considered preferable to the account and figure given by the French author.—Tr.

†A French line is the twelfth part of an inch, as an inch is the twelfth part of a foot; but the French foot is rather more than six-tenths of an inch longer than ours.—Tr.

*Nothing farther is said of the form or use of the moulding, and the sentence is continued as above, in the original. The words in brackets in this description are added by the translator.

so that in making the turns to put it through the succeeding holes, the bark of the band may lie outwards on the upper part of the turn. Before finishing the first round, the straw should be wrapped a second time with another band passing through the grooves, so that the first roll is twice tied.

When the second round is begun, which rises spirally on the first, a pointed iron is thrust through the straw of the first round so that the iron makes an X with the *ties* passed through the grooves; by this means the fastenings of the upper and lower rolls are crossed and firmly bound in an X.* The ends of the bands are concealed between the rolls; and fresh straw is inserted in the middle of the rolls, whenever their size is seen to be diminished. The hive begun upon the frame may be separated from it at the third or fourth round, [by cutting away the first wrappings of the bottom roll, through the holes of the rim,] and then carried on to the height of 13, 14, or 15 inches.

The lid is commenced in the same way as the hive; on beginning the third round it is drawn in a little, and this is continued until it forms a dome, and reaches the prescribed height: an opening is left at the top to receive the handle or spire, which is firmly fastened as mentioned above.

To preserve the hive from the injuries of the air and the sun, it is covered with a moveable outside coating or thatching of straw, which may be fastened around a piece of wood which forms the top, and in which there must be a hole to receive the spire of the hive. The thatch spreads out at bottom so as to be nearly or quite twice as wide as the hive it shelters, and reaches within two inches of the bottom of the hive. A hoop should enclose and preserve the form of the lower part, and a small earthern flower pot, turned bottom upward, will form a suitable capping for the top.†

CHAPTER X.

On Apiaries.

Covered apiaries are common in may districts of France; these are generally improper, as they have several rows of hives placed one above another, and it is certain that the row nearest the ground thrives better than the higher ones. These aparies besides, are expensive; they are too confined, and cannot contain a great number of hives; it is difficult to rob them, and placing the the hives upon the same stand injures both the bees and their owners, for when one hive is touched, the bees of all the hives on the same stand are put into commotion, and then it is not easy to approach them.

There are some apiaries covered like tents; but these are also defective, for when the sun shines full upon them, the interior becomes insupportably hot, which injures the bees and makes their structures soft and weak.

To avoid expense, to give the bees sufficient liberty, to attend properly to them, and procure the honey without difficulty, the hives should be kept in the open air, with a good outside coating to protect them from excessive heat, snow, and rain; they should be placed on separate stands, with a passage of at least 15 inches between each, The stands should be raised about a foot from the ground, that the dampness of the winters may not mould the edifices of the bees. All the hives should be in the same vicinity, that they may be watched in the swarming season, and they may be ranged in straight or semi-circular rows at an interval of 4 or 5 feet between each row. The best exposure is towards the east, inclining to the south, taking care to shelter the hives from the hard winds of the west and north. Such an apiary will be agreeable to the sight, the owner will be able to move about in it with convenience, to attend to the bees and rob them with ease without disturbing those that are on the adjacent stands.

A MANUAL

FOR THE MANAGEMENT OF BEES DURING EACH MONTH OF THE YEAR, &c. &c.

1. Precise rules should always be given, as we shall do here, leaving, however, to those who would profit by them, the ability to modify them according to circumstances. By following the rules which we shall lay down, success may be calculated upon; but it will tend much to insure that success, if with the care there is united an affection for the bees. What opposes this sentiment is the fear of being stung; this timidity then, must be overcome: let those who are subject to it muffle themselves up well when they first approach the bees; by using gentleness and calmness, and exacting these qualities of those who are about them, they will soon be convinced that there are few cases in which their defensive dress is necessary; and I assure them that the oftener they go among the bees the greater their attachment to them will become, and the admiration with which they will frequently be inspired, will give them a pleasure which is certainly one of the most lively of a country life.

Bees should never be breathed upon, as the human breath has a quality which irriates them; for if they are blown upon with a pair of bellows, they are more inclined to escape than to sting. When we wish to drive them off from any place, they should be gently removed with the feathers of a quill. Bees are less tractable during the night and after sunset, than in the day, because a bright light dazzles them. We should never fight bees; if they pursue us we should withdraw quitely, retire to the shade, and allow them half an hour to become calm.

*October**

2. To prepare a sirop for the bees, dissolve some common honey in new wine, cider, perry, or molasses, in the proportion of one pound of honey to each bottle of the liquid; add a handful of salt, and boil the whole gently down to sirop. This is to be put in bottles or other vessels, and kept in a vault or cellar, to be used as hereafter directed.

3. Stock or mother-hives may be bought either before or after the winter. Where it can be done, they should be purchased after the winter is over,

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* The translation here is very literal, but I confess that I do not clearly understand the *modus operandi*,—probably from want of a little mechanical skill. A workman perhaps, will readily hit upon the proper way of fastening the rolls together.—Tr.

† To avoid the expense of an additional and unnecessary plate, some alteration has been made in the form of this paragraph, taking care to preserve the author's meaning.—Tr.

* To preserve a proper order in the details for the management of bees, their year has been commenced with this month.

because, then, the bees having gone through the bad season, will have but little danger to incur.

They who would buy hives in this month should ascertain, first, that the bees are of the small kind, and the hives of good weight; secondly, they should examine the interior of the hives; if the combs are white or yellow, and have a good odor, they may be safely purchased.

4. As the cold, which now begins to be felt, makes the bees rise among the combs, to seek a milder temperature, there must be put at the entrance of each hive a *grating*, which, without depriving the bees of necessary air, may prevent the access of their foreign enemies. These *gratings* are little pieces of board pierced with small holes, and having an entrance for the bees, two inches long and four lines high. They are fastened with a *luting*, and should be kept so all the winter, except when there is a thaw of snow, during which the bees should be closely confined, without, however depriving them of air.

5. Between the 10th and 20th of October, the bees that have been carried out to feeding grounds at the end of July, (No. 40) should be brought back. This may be done in the same way as they were carried, except that there will be now no necessity for travelling by night.

6. In replacing the hives brought back from the feeding grounds, those should be marked which are judged by their weight to be in a fit state for being robbed. This may be done on any fine clear morning, by taking of the lids that are full, in the manner afterwards described.

7. The outside coatings should be put in good order to prevent the autumn rains from wetting the hives or lids; and if the rain has penetrated to them before the coverings are repaired, they should be exposed to the sun on the first bright day, that that they may be dried.

November.

8. When bees are to be removed to any distance, a cloth should be spread upon the ground near the hive; the hive is then to be put upon the cloth, which is drawn up over it and securely tied, so that the bees cannot escape. In this state they are transported by water, where it is practicable; or they may be carried by land on hand-barrows, or suspended to a stick borne by two men, or they may be carried on the shoulders in a scuttle. They are carried also in panniers, on asses or horses.—Finally, if a number of hives are to be transported to a considerable distance, a large wagon may be employed. The body of this should be filled with trampled straw or coarse litter, which should be moistened to render it less slippery, and prevent the jostling of the hives on the road. The hives should be placed on the straw in their natural position, and confined by small ropes and wisps of straw, to prevent the jolts from striking the hives against each other, or against the sides of the wagon. Additional hives may be attached to the body of the wagon on the outside, so as to be kept steady; the whole should be secured from the rain, and driven with care. On reaching their destination they should be set down in the apiary; half an hour afterwards the cloths may be taken off, and if the bees are quiet they may be put upon the stands without *luting* the hives, but the gratings should be attached. The proper time for making these arrangements, is in the cool of the morning.

9. In cool weather, when the bees have retired between the combs, the hives are examined to ascertain their condition and weight,—and the stands are cleansed. For this last purpose, at the extremity of each row of hives there is a moveable stand on which the first hive is placed; then, with a handful of straw or hay, the first stand is cleansed and the second hive is set upon it, and so on in succession. When the row is finished the hives are restored to their first situations, taking care to mark those that are light, that the bees may be fed.

10. In a broad and shallow vessel, such as a plate, put two or three pounds of sirop, and let it be covered with bits of straw to prevent the wings and bodies of the bees from being smeared when taking their food. The vessel should be put within the hive, and this sirop with what the bees have still remaining, will be sufficient for their support till the end of February. If the edifices of the bees come down close to the stand, their food should be placed upon the board at the top of the hive and covered with the lid, after taking out the stick which passes through it.

11. Few insects are as sensible of cold as bees; if placed singly in a temperate atmosphere, they would all perish; but when collected in a good hive, they support a great degree of cold: it is even affirmed that severe winters are better for them and more profitable to their owners than mild winters. The bees have little activity, and consume but little in cold winters; whereas, in mild ones, they consume a great deal, and the hive, continually full of the vapors which exhale from the multitude which occupies it, would become a damp habitation, full of mouldiness, unhealthy and fatal, if the vapors could not escape and fresh supplies of air be introduced. To effect these objects, the hives should be neither closely fitted nor luted to the stands; and they will pass securely through the winter, if well muffled with outside coverings of straw sufficient to shelter both them and their stands from the sun, the rain and the snow; put on, however, in such a manner as to leave the entrace of the gratings free, and with a good hoop, as mentioned before, to protect the straw from the action of the wind.

December, January, February.

12. In very cold weather the hives should not be moved nor even touched, because the bees which would fall upon the stand, being unable to go up again into the combs, would perish.

13. During great thaws, the vapors which have been exhaled, and which continue to rise from the numbers which inhabit the hive, cause so great a humidity, that the water runs down in the interior along the sides of the lids and hives, so that the inner circumference of the stand is covered by it, while the centre, where the bees stay, near the eggs and young, is preserved from this species of inundation by means of the board at top. If this water should remain for some time on the stands, the ends of the combs would become mouldy, and give the interior of the hive a disagreeable and unhealthy smell. This should be prevented by cleansing and drying the hives, as directed, at 9.

14. When the snow is melting, in a clear and tolerably warm day, which commonly happens in

February and March, the bees deceived by the mild temperature quit the hives, and as they fly very low, the coldness of the earth and snow, over which they pass, strikes them, and they fall and perish. To prevent this accident the entrance of the grating should be temporarily closed, but so as to leave the little holes open to supply air to the bees. When the snow is completely melted, their liberty may be restored.

15. In February, if the winter has been mild, the bees in the light hives must be supplied with food as directed in No. 10.

16. The cold weather being over, hives may be purchased and conveyed as in Nos 3 and 8.

March.

17. In the cool of the morning, the bees should be smoked by inclining the hive to one side; and, with a knife, all the black wax and lower parts of the combs which appear to be spoiled, should be pared off.

18. By following these directions, the dysentery seldom makes its appearance among the bees. See what has been said of it in chap. vii.

April.

19. Where there is a scarcity of water in the vicinity, it should be provided for the bees, and so disposed that they may run no risk of being drowned. For this purpose there must be made of a cask, two tubs of eight or ten inches deep. They should be sunk into the earth to a level with its surface, and so placed, near a well, that the water from one may flow into the other. In each vessel, five or six inches of earth are put, and they are then filled with pure water, and three or four water cresses with their roots are planted in each. These cresses will soon cover the tubs, their vegetation will preserve the water pure, and the bees will frequent it without danger. If two tubs are not sufficient, others may be added, taking care that the water shall flow from one to another, and all should be kept full during the summer. There is no danger to be apprehended in approaching the bees which come to drink; and as they are very cleanly, the cresses may be used at table to prevent their becoming too thick.

20. The principal object in keeping bees, is to obtain from them as much wax and honey as possible; and it is this which induces those persons who are in the habit of smothering their bees, to destroy all in the heaviest hives. But we, who wish to preserve our bees, imitate these destroyers only in their desire to obtain the stores of the fullest and heaviest hives, without waiting till they are four or five years old. Therefore, when the apiary is sufficiently stocked, preparations may be made for transferring the bees from the well stored hives to others. At the commencement of the fine weather, the bees should be put in a position which will compel them to work in a new hive. To effect this, let the full hive be removed from its stand, and an empty one set in its place; the old one should then be fixed upon this, and luted to it, having its entrance also securely closed. The bees, having no other means of exit, will soon become accustomed to the new hive. As their number is increased by the hatching of the new brood, they are too much crowded in the full hive, and their instinct forcing them to labor in this season, they will soon establish themselves in the new hive, to which the cleanliness of the cells will in a short time attract the queen, now in the height of her laying, and she also will continue in the new abode. Both hives must be left in this state until the structures in the new one have been finished, and until the young brood of the old one has reached its maturity and taken its flight; this will happen at the end of four or five months, or in the beginning of the summer in the following year.

21. Those persons who have single undivided hives, of the old form, may also make the preparations for transferring their bees into the village hive. [This appears to be the name, given here for the first time, to the straw hive and lid previously described.] For this purpose, if the base of the old hive does not exceed 14 inches in diameter, it may be fixed and luted upon the hive I have mentioned, which must then be set in the place of the old one. But if the old hive has a greater diameter, a border or exterior roll of straw must be added to the new one on which the old is to be placed and luted, so that the bees may not be able to do out or in, except by the new hive. The two hives are to be left in this position until the proper time for completing the transfer of the bees, as directed in No. 45.

22. If the moth which produces the *wax-worm* appeared at only one season of the year, it would be easy to make war upon it; but it shows itself first in April, and is seen in each successive month until the end of October. To destroy this insect, the following means may be employed:

The entrance of the hive should be small, and they should be luted to the stands so that only the entrance may be open; and as the moths attack weak hives, whose entrances are ill defended, sooner than strong ones, we should endeavor to have only good hives. The bats which come into the neighborhood of the hives should not be frightened or driven away, as they seize and swallow these night moths in their flight. The moth keeps itself concealed during the day against the hives, under their coverings, beneath the stands, and in obscure corners of the apiary; therefore during this month and until the last of October, the coverings of the hives should be occasionly taken off, and the insects should be sought for and destroyed, which may be easily done, as from not seeing well in the day they never move. Some cakes of wax should be fixed against the sides of the hives under the coverings; the smell of these will attract the moths, and they will go upon them to deposite their eggs. Finally, if these insects are very numerous, two old hives must be sacrificed in succession to destroy them. Let one of these be raised on small wedges or blocks about 6 lines thick; the moths finding an easy entrance, will flock to it in great numbers; and when it is observed that the worms have taken possession, and the bees have deserted the hive, it should be carried off and burned with all its contents. The other hive should be immediately set upon the blocks and treated in the same way. It has been said that lights should be set near the hives, into which the moths will fly and be burned at night; this is true, as we may infer from the moths which produce the little insects that gnaw the woollen stuffs in our houses, and which fly into our candles at night. This remedy might be practicable, if the wax-moths appeared only at one season; but as they are seen for more than six months together, this plan

cannot be adopted; and besides, it would be dangerous near hives covered with straw.

23. The gratings directed to be attached to the hives in No. 4 should now be taken off.

24. We should remember that it is only in this season and until the end of June, that the bees make their structures in wax, therefore the lids that are full should be robbed between the latter end of April and the first of June, that the bees may still have time to form new combs in the empty lids which are substituted for those that are full. With the back of the middle finger strike upon the lids; those which return a hollow sound should be left; those which are full will give a dull sound; and the strings which fasten these to the hives should be untied, and the luting taken off with the point of a knife: and as the bees will also have plastered with propolis on the inside the little opening between the hive and the lid, we must, standing at the back of the hive, draw to us the handle of the lid just enough to loosen it. It happens sometimes, that the combs of the lid are attached to the board at the top of the hives by some junctions in wax; in this case a blade of iron or brass should be passed between the hive and the lid, to separate the points of junction, which are not numerous; the blade should be left in its place to allow the bees to become calm after the agitation which may have been excited by the motion around and above them.

Between ten and eleven o'clock in the morning in fine weather, when many of the bees are abroad, two or three slight blows should be struck with a rod on the body of the hive to attract the queen to it; an instant after, the full lid should be taken off without attending to the bees that may remain in it, and an empty lid should be put in its place. The full lid is to be carried into a close room, free from cobwebs; a passage by the door or window must be left to allow the bees to see their way out to go and join their queen; the cells which contain the honey being closed, the bees from other hives will not come to plunder, and those belonging to the lid not being daubed with honey, will fly off in the space of an hour. There are, however, some lids which the bees are unwilling to quit; in this case they come from between the combs to congregate on the outside of the lid, and they should be swept with the feathers of a quill into some vessel and carried to the entrance of the hive, into which they will soon return. When all the bees have gone from the lids they should be removed into some close place, secure from the farther access of the bees. If any portion of honey comb has remained upon the board of the hive, it must be taken off, so that this board may be always clean, and nothing left on it to serve the bees as a foundation for a superstructure of new comb.

May.

25. As the *swarming* of the bees commences in this month, we should get ready a sufficient number of hives of the different sizes before directed.

26. The signs which announce the approaching departure of the swarms, are—1st. That the drones or males issue from the hives in great numbers from about noon till three o'clock, and have a bold and steady flight. 2d. That the stands are moist in the morning at the entrance of the hives; this moisture indicates the excessive heat within the hives, from the great number of bees that are crowded together. 3d. That on listening close to the hive in the evening, a confused buzzing is heard in which a shrill sound is distinguished resembling the note of the grasshopper, and which appears to be emitted by a single bee.

27. The swarms do not quit the mother-hives in cold or cloudy weather, nor while it is raining, and seldom when the wind is at the north; they take their flight when the wind is southerly or easterly, when it is calm and the sun shines; frequently in showery days, when the sun in the interval between two showers produces a sultry heat, and sometimes between two warm rains.

28. A swarm, when leaving the hive, makes an extraordinary buzzing, which cannot be mistaken. The bees that first go out return, hover for a moment before the hive, and then fly off: at this signal the others rush out, offering the image of a stream flowing with great rapidity. The bees which first left the hive lead the others; the queen comes out afterwards and joins the swarm. If the swarm, after having settled, or been hived, continues in a state of agitation, which is manifested by a great buzzing and a confused hurrying of the bees, it is certain that some accident has happened to the queen. She must then be sought for near the hive from which she should have issued, and may be found the more easily as she is accompanied by her escort, which never abandons her; she must be taken gently and carried to the swarm, in which an immediate calm will be produced. If the queen should have been unable to leave the hive the swarm will return to it to join her, and they will come out again on the next day, or in a few days after.

29. The swarms settle either on the earth or on the branch of a tree, on a shrub, or on some solid body. In whatever position they may be, we should hasten to hive them, as they will not remain long quiet, particularly if exposed to a hot sun. But if for any reason they cannot be hived immediately, a second departure should be prevented by sheltering them with bushes, or with a wet cloth.

30. When the swarm is to be hived, every thing should be done gently, without agitation and without fear; therefore the head should be muffled up and the arms and legs covered, to guard against the stings of the bees. Quietness and silence should be enjoined on all present. The hive, with its lid separate, is to be brought near to the swarm and set upon the ground, or on a small light plank; one side of it should rest on a small stick or on a pebble, to raise it sufficiently to allow the bees which are to be put into it to go in and out with ease; a little stick five or six lines thick, should be put also on the board at the top of the hive. The bees must then be shaken from the branch on which they have settled into the lid; or if they are attached to any solid body, they must be swept into the lid with a bunch of feathers, or other soft instrument. The lid should be held for an instant with its mouth upwards, to allow the bees that have fallen on their backs to turn; it should then be placed upon the hive *softly*; this should be done softly to prevent the bees from falling down in clusters on the board of the hive. This mode is easy and less inconvenient than collecting the swarm in a whole hive, besides that it insures the bees commencing their labors in the lid. I have seen swarms hived in whole hives, not work in the

lid at all during the first year. When the swarm is hived, the bees will remain if the queen is with them; but if she is not, they will desert the hive to rejoin her, and it will be necessary to hive them a second time. After the bees are settled in the hive, the little stick which is on the board at top, must be gently withdrawn, and the lid tied on and luted to the hive; the whole may then be removed, if necessary.

31. If, during this month, several swarms leave the apiary at the same time, we must endeavor to prevent their uniting, by casting handfuls of dust between them. If, notwithstanding, the swarms unite, the bees must be separated when settled, and put into two hives; this succeeds when there happens to be a queen in each, but otherwise the hive in which there is no queen will soon be abandoned by the bees to go into the other. In this case the lid of the hive in which both swarms are, should be raised; and when it is observed to be nearly full, it must be set upon an empty hive, taking care to put another lid on the first. Should this fail, and the bees still persist in occupying the same hive, it must be marked and managed as will be directed in the following month.

32. When two swarms issue at the same moment, or nearly so, if the one is a first swarm from a hive and the other a second swarm, although they may be hived separately, if the two new hives are placed near each other and in sight, the bees of the second swarm, although they have a queen, generally quit her to go and join the queen of the first swarm, because this last being the mother-queen of the hive from which she issues, is impregnated, while the other is yet in her virgin state. This happens because the bees have but a slight attachment to their queens when in their virgin state, while their affection is very strong for those that are laying. When a case of this kind occurs, to prevent the union of the two swarms the hives must be quickly carried to a distance from each other.

33. If swarms issue soon after others have been hived, the leaders of the last, attracted by the odor which the first have left behind them, rush into the hive and are mixed with those recently secured. To remedy this inconvenience we must quickly destroy the traces of the queens. For this purpose, as soon as a swarm is in its hive, it should be removed and carried to a distance; if there is not time for this, and the mixture has commenced, the lid of the hive containing the first swarm should be removed immediately, and put upon another hive, which is to be carried away from the first.

34. Persons desirous of forming an apiary with swarms, should take advantage of this season, for then they will be sure to have their bees in the best condition. Such only, however, as live within a league of an apiary can enjoy this advantage, as the bees must be carried gently, and in the arms, on the very day that they are hived.

35. When new hives are raised to supply the bees with food, it should be done very carefully, without shaking them or inclining them to one side, because the structures having as yet no consistence, and being surcharged with bees, might fall and occasion disorder in the hive. Except for this purpose new swarms should never be touched nor even examined till a month after their establishment, because not until then will their works have acquired solidity.

June.

36. When the springs are backward, the swarms do not appear before the first of June, and there are exposures in which they never appear till this time. In these circumstances the swarming season is protracted until the first days of July; but generally in our climate as the season of flowers is departing by the middle of June, the bees which swarm after this time being engaged, at first, in preparing cells for the eggs of their queen, have not time to construct the combs necessary for receiving abundant stores. It is neeessary, therefore, to conform to the course of nature, and to keep the swarms in the mother-hives when the season is advanced.

July and August.

37. The destruction of the males takes place sometime in the month of May or of June in weak hives, and in this case we are to expect no swarms. In the other hives, this destruction occurs in the course of July and August. Once commenced, the slaughter continues till all the drones are killed, and occupies four or five days for each hive.

38. At the end of this month, as the structures of the new swarms have then acquired some solidity, they may be examined to ascertain if they have thriven; this may be judged of also by the weight of the hives.

39. Some persons preserve all their swarms, however weak they may be, hoping that they will be strengthened by the laying of the queen: but these swarms, particularly those which are hived about the end of June, can often make only combs enough to fill the lids of their hives. There are two ways of turning these swarms to account; the first is to take off, in July or August, a full lid from an old hive, and to substitute for it a lid containing a weak swarm; this way of uniting them is the easiest, causes no strife, and furnishes a strong hive. The second way is, when a hive is suffering from pillage, to take off its lid and put in the place of it another, containing also a feeble swarm; the disorder will soon cease, the bees which have lost their queen will attach themselves to her who is given to them, and form a good hive. If the weak swarms should already have constructed some pieces of comb in the body of the hive, it should not be regarded; but in this case, when we wish to put the weak swarm on another hive, we must drive the bees into the lid by smoking them for a little while.

40. At the end of July the owners of bees which are on level and unsheltered districts, where they now rather consume than add to their stores, will transport their hives to the vicinity of forests; this transportation may be made by water, or by land in wagons. If the transportation is made by water several owners may unite; and the hives, after having been wrapped up in cloths, should be carried on hand-barrows to the boats, into each of which three or four hundred may be put. They are then to be conveyed to the vicinity of forests adjacent to rivers. Boats and boatmen who will take charge of the bees, may be easily procured at the rate of eight or ten *sous* per hive.

The boatmen should take care to keep sheltered from the hard winds which usually blow about the end of September, the time of the equinox; and when they desire to move to a new place it should be done in the evening after the bees have

returned to the hives, or at night, or early in the morning before the bees have gone out, otherwise the bees that are abroad might have great difficulty in finding their hives. If the bees are to be conveyed by land in wagons, the inconveniences which may result from the heat of the season should be obviated. Therefore, a cool evening should be chosen; the cloths which envelope the hives should be wetted, the straw also in which they are placed must be wet, to render it cooler, more supple, and less slippery. The wagons should be covered with cloths, tied loosely to allow the wind to agitate them on their passage, or boughs with their leaves may be fixed over the wagons so as not to touch the hives. In this condition, they should set out after sunset and travel all night so as to reach their destination by seven or eight o'clock in the morning, stopping only long enough to feed the horses; in this way a distance of ten or twelve leagues may be accomplished.

Individuals may readily be found willing to receive the bees, and who, for a recompense of eight or ten *sous* per hive, will attend to their preservation; this, at least, is the case in the neighborhood of the forest of Orleans. A small gratification is added besides, proportioned to the care bestowed by the keeper, who is responsible for no accident, not even for the loss of the hives by robbery. Neither posts for the stands, nor stands themselves are now required to support the hives, as the humidity of the earth is but little felt at this season. The hives may be set in the fields, near some shelter or arbor, upon small pieces of plank a little raised by stones placed under them: the bees will defend themselves from all creatures that attempt to enter the hives.

August.

41. The death of the queens generally occur in this and the following month. We should occasionally take a look at the hives, and if in any the bees are observed to be in commotion while those in the other hives are quiet, the queens of the first are dead, and the hives suffering from pillage; they should be set aside for examination. If there is any *grated* wax, that is, parcels of wax reduced to the size of coarse bran upon the stands, and if the hives are not defended by the working bees, they should be immediately removed to save the remnant, or to supply them with queens, as in No. 39.

42. At the end of this month those persons who are not in a situation to send their bees to new feeding grounds, should sound their hives, and judging thus of their weight, should take the lids supposed to be full. (See No. 24.)

September.

43. The last robbing of the lids may now be made, as directed in No. 24.

44. In the course of this month we should examine the village hives, prepared as in No. 20, for the transferring of the bees; and if there is a sufficient quantity of comb in the new hive, the transfer should be completed. For this purpose, on some clear day, about ten o'clock in the morning, strike, with a rod, some slight blows on the new hive to attract the queen to it. Then, leaving the new hive upon the stand, separate from it the old one and place it upon the rounds of a chair turned upon its side. Put an empty lid upon the new hive, loosen the lid which is on the old hive, and then smoke it from below; the bees will immediately take refuge in the lid, which must be raised from time to time to see if they have ascended. If they have, take off the lid which is upon the new hive and replace it by that which is upon the old one: carry the old hive into a room at some distance from the apiary, leaving the door and windows open that the bees still remaining in the hive may go to seek their queen. Some days after, these new hives must be covered with full lids, which should be taken off other hives with the bees that are in them. These hives will, in all probability, flourish. If there is but little comb in the new hives, the two must be left untouched, and the transfer postponed till the succeeding year.

45. To complete the transfer from the hives of the old form, several holes should be made in the top of the hive, so that the bees may pass through them easily. A lid must be placed upon each, the old hives must be taken off the new ones and smoked, and the transferring of the bees completed as in No. 44.

For the Farmers' Register.

SUPPLEMENTARY CHAPTER TO 'AN ESSAY ON CALCAREOUS MANURES.'

The use of calcareous earth recommended to preserve putrescent manures, and to promote cleanliness and health.

The operation of calcareous earth in enriching barren soils, has been traced, in a former part of this easy, to the chemical power possessed by that earth of combining with putrescent matters, or with the products of their fermentation—and in that manner, preserving them from waste, for the use of the soil, and for the food of growing plants. That power was exemplified by the details of an experiment, (page 91,) in which the carcass of an animal was so acted on, and its enriching properties secured. That trial of the putrefaction of animal matter in contact with calcareous earth, was commenced with a view to results very different from those which were obtained. Darwin says that *nitrous acid* is produced in the process of fermentation, and he supposes the *nitrate of lime* to be very serviceable to vegetation.* As the nitrous acid is a gas, it must pass off into the air, under ordinary circumstances, as fast as it is formed, and be entirely lost. But as it is strongly attracted by lime, it was supposed that a cover of calcareous earth would arrest it, and form a new combination, which, if not precisely nitrate of lime, would at least be composed of the same elements, though in different proportions. To ascertain whether any such combination had taken place, when the manure was used, a handful of the marl was taken, which had been in immediate contact with the carcass, and thrown into a glass of hot water. After remaining half an hour, the fluid was poured off, filtered, and evaporated, and left a considerable proportion of a white soluble salt (supposed eight or ten grains.) I could not ascertain its kind—but it was not deliquescent, and therefore could not have been the nitrate of lime. The spot on which the carcass lay, was so strongly impregnated by this salt, that it remained bare of vegetation for several years.

* Darwin's Phytologia pp. 210 and 224. Dublin Edition.

But whatever were the products of fermentation saved by this experiment, the absence of all offensive effluvia throughout the process sufficiently proved that little or nothing was lost—as every atom must be, when flesh putrefies in the open air: and I presume that a cover of equal thickness of clay, or sand, or of any mixture of both, without calcareous earth, would have had very little effect in arresting and retaining the aeriform products of putrefaction. All the circumstances of this experiment, and particularly the good effect exhibited by the manure when put to use, prove the property of extending a simliar practice. In the neighborhood of towns, or wherever else the carcasses of animals, or any other animal substances subject to rapid and wasteful fermentation, can be obtained in great quantity, all their enriching powers might be secured, by depositing them between layers of marl, or calcareous earth in any other form. On the borders of the Chowan, immense quantities of herrings are often used as manure, when purchasers cannot take off the myriads supplied by the seines. A herring is buried under each corn-hill, and fine crops are thus made, as far as this singular mode of manuring is extended. But whatever benefits may have been thus derived, the sense of smelling, as well as the known chemical products of the process of putrefaction, make it certain that nine tenths of all this rich manure when so applied must be wasted in the air. If those who fortunately possess this supply of animal manure would cause the fermentation to take place, and be completed, mixed with and enclosed by marl, in pits of suitable size, they would increase prodigiously both the amount and permanency of their acting animal manure, besides obtaining the benefit of the calcareous earth mixed with it.

But without regarding such uncommon or abundant sources for supplying animal matter, every farmer may considerably increase his stock of putrescent manure, by using the preservative power of marl: and all the substances that might be so saved, are not only now lost to the land, but serve to contaminate the air while putrefying, and perhaps to engender diseases. The last consideration is of most importance to towns, though worthy of attention every where. Whoever will make the trial will be surprised to find how much putrescent matter may be collected from the dwelling house, kitchen, and laundry of a family; and which if accumulated (without any calcareous earth,) will soon become so offensive, as to prove the necessity of putting an end to the practice. Yet it must be admitted that when all such matters are scattered about (as is usual both in town and country,) over an extended surface, the same putrefaction must ensue, and the same noxious effluvia be evolved, though not enough concentrated to be very offensive, or even always perceptible. The same amount is inhaled—but in a very diluted state, and in small, though incessantly repeated doses. But if mild calcareous earth in any form (and fossil shells present much the cheapest,) is used to cover and mix with the putrescent matters so collected, they will be prevented from discharging offensive effluvia, and preserved to enrich the soil. A malignant and ever acting enemy will be converted to a friend and benefactor.

The usual dispersion and waste of such putrescent and excrementitious matters about a farm house, though a considerable loss to agriculture, may take place without being very offensive to the senses, or injurious to health. But the case is widely different in towns. There, unless great care is continually used to remove or destroy filth of every kind, it soon becomes offensive, if not pestilential. During the last summer, when that most horrible scourge of the human race, the Asiatic cholera, was desolating some of the towns of the United States, and all expected to be visited by its fatal ravages, great and unusual exertions were every where used to remove and prevent the accumulation of filth, which if allowed to remain, it was supposed would invite the approach, and aid the effects of the pestilence. The efforts made for that purpose served to show what a vast amount of putrescent matter existed in every town, and which was so rapidly reproduced, that its complete riddance was impossible. Immense quantities of the richest manures, or materials for them, were washed away into the rivers; caustic lime was used to destroy them—and the chloride of lime to decompose the offensive products of their fermentation, when that had already occurred. All this amount of labor and expense was directed to the complete destruction of what might have given fertility to many adjacent fields, and yet served to cleanse the towns but imperfectly, and for a very short time. Yet the object in view might have been better attained by the previous adoption of the proper means for preserving these putrescent matters instead of destroying them. These means would be to mix or cover all accumulations of such matters with rich marl, (which would be the better for the purpose if its shells were in small particles,) and in such quantity as the effect would show to be sufficient. But much the greater part of the filth of a town is not, and cannot be accumulated; and from being dispersed, is the most difficult to remove, and is probably the most noxious in its usual course of fermentation. This would be guarded against by covering thickly with marl the floor of every cellar and stable, back yard and stable lot. Every other vacant space should be lightly covered. The same course pursued on the gardens and other cultivated grounds would be sufficiently compensated by the increased product that would be obtained: but independent of that consideration, the manures there applied would be prevented from escaping into the air—and being wholly restrained by the soil, much smaller applications would serve. The streets ought also to be sprinkled with marl, and as often as circumstances might require. The various putrescent matters usually left in the streets of a town alone serve to make the mud scraped from them a valuable manure; for the principal part of the bulk of street mud is composed merely of the barren clay, brought in upon the wheels of wagons from the country. Such a cover of calcareous earth would be the most effectual absorbent and preserver of putrescent matter, as well as the cheapest mode of keeping a town always clean. There would be less noxious or offensive effluvia, than is generated in spite of all the ordinary means of preventation; and by scraping up and removing the marl after it had combined with and secured enough of putresecnt matter, a compost would be obtained for the use of the surrounding country, so rich and so abundant, that its use would repay a large part, if not the whole of the expense in-

curred in its production. Probably one covering of marl for each year would serve for most yards, &c. but if required oftener, it would only prove the necessity for the operation, and show the greater value in the results. The compost that might be obtained from spaces equal to five hundred acres in a populous town, would durably enrich thrice as many acres of the adjacent country: and after twenty years of such a source, the surrounding farms might be capable of returning to the town a ten-fold increased surplus product. After the qualities and value of the manure so formed were properly estimated, it would be used for farms that would be out of the reach of all other calcareous manures. Carts bringing country produce to market might with profit carry back loads of this compost six or eight miles. The annual supply that the country might be furnished with, would produce very different effects from the putrescent and fleeting manure now obtained from the town stables. Of the little durable benefit heretofore derived from such means, the appearance of the country offers sufficient testimony. At three miles distance from some of the principal towns in Virginia, more than half the cultivated land is too poor to yield any farming profit. The surplus grain sent to market is very inconsiderable—and the coarse hay from the wet meadows can only be sold to those who feed horses belonging to other persons.

But even if the waste and destruction of manure in towns were counted as nothing, and thepreservation of health by keeping the air pure were the only object sought, still calcareous earth, as presented by rich marl, would serve the purpose far better than quick-lime. It is true, that the latter substance acts powerfully in decomposing putrescent animal matter, and destroys its texture and qualities so completely, that the operation is commonly and expressively called "burning" the substances acted on. But to use a sufficient quantity of quick-lime to meet and decompose all putrescent animal matters in a town, would be intolerably expensive and still more objectionable in other respects. If a cover of dry quick lime in powder were spread over all the surfaces requiring it for this purpose, the town would be unfit to live in; and the nuisance would be scarcely less, when rain had changed the suffocating dust to an adhesive mortar. Woollen clothing, carpets, and even living flesh would be continually sustaining injury from the contact. No such objections would attend the use of mild calcareous earth: and this could be obtained probably for less than one fifth of the cost of quick-lime, supposing an equal quantity of pure calcareous matter to be obtained in each case. At this time the richest marl on James River may be obtained at merely the cost of digging, and its carriage by water, which if undertaken on a large scale, could not exceed, and probably would not equal three cents the bushel.

The putrescent animal matters that would be preserved and rendered innoxious by the general marling of the site of a town, would be mostly such as are so dispersed and imperceptible that they would otherwise be entirely lost. But all such as are usually saved in part, would be doubled in quantity and value, and deprived of their offensive and noxious qualities by being kept mixed with calcareous earth. The importance of this plan being adopted with the products of privies, &c. is still greater in town than country. The various matters so collected and combined should never be applied to the soil alone, as the salt derived from the kitchen, and the potash and soap from the laundry, might be injurious in so concentrated a form. When the pit for receiving this compound is emptied, the contents should be spread over other and weaker manure, before being applied to the field.

Towns might furnish many other kinds of rich manure, which are now lost entirely. Some of these particularly require the aid of calcareous earth to be secured from destruction by putrefaction, and others, though not putrescent, are equally wasted. The blood of slaughtered animals, and the waste and rejected articles of wool, hair, feathers, skin, horn and bones, all are manures of great richness. We not only give the flesh of dead animals to infect the air, instead of using it to fertilize the land, but their bones which might be so easily saved, are as completely thrown away. Bones are composed of phosphate of lime, and gelatinous animal matter, and, when crushed, form one of the richest and most convenient manures in the world. They are shipped in quantities from the continent of Europe to be sold for manure in England. The fields of battle have been gleaned, and their shallow graves emptied for this purpose: and the bones of the ten thousand British heroes who fell on the field of Waterloo, are now performing the less glorious but more useful purpose of producing wheat for their brothers at home.

There prevails a vulgar but useful superstition, that there is "bad luck" in throwing into the fire any thing, however small may be its amount or value, that can serve for the food of any living animal. It is a pity that the same belief does not extend to every thing that as manure can serve to feed growing plants—and that even the parings of nails, and clippings of beards are not used (as in China) in aid of this object. However small each particular source might be, the amount of all the manures that might be saved, and which are now wasted, would add incalculably to the usual means for fertilization. Human excrement, which is scarcely used at all in this country, is stated to be even richer than that of birds; and if all the enriching matters were preserved that are derived not only from the food, but from all the habits of man, there can be no question but that a town of ten thousand inhabitants, from those sources alone, might enrich more land than could be done from as many cattle.

The opinions here presented are principally founded on the theory of the operation of calcareous manures, as maintained in the foregoing part of this essay: but they are also sustained to considerable extent by facts and experience. The most undeniable practical proof of one of my positions, is the power of a cover of marl to prevent the escape of all offensive effluvia from the most putrescent animal matters. Of this power I have made continued use for about eighteen months, and know it to be more effectual than quick-lime, even if the destructive action of the latter were not objectionable. Quick-lime forms new combinations with putrescent substances, and in thus combining, throws off effluvia, which though different from the products of putrescent matter alone, are still disagreeable and offensive. Mild lime on the contrary absorbs and preserves

every thing—or at least prevents the escape of any offensive odor being perceived. Whether putrescent vegetable matter is acted on in like manner by calcareous earth cannot be as well tested by our senses, and therefore the proof is less satisfactory. But if it is true that calcareous earth acts by combining putrescent matters with the soil, and thus preventing their loss, (as I have endeavored to prove in chapter viii.) it must follow that to the extent of such combination, the formation and escape of all volatile pruducts of putrefaction will also be prevented.

But it will be considered that the most important inquiry remains to be answered: Has the application of calcareous manures been found in practice decidedly beneficial to the health of the residents on the land? Long experience, and the collection and comparison of numerous facts, derived from various sources, will be required to remove all doubts from this question; and it would be presumptuous in any individual to offer as sufficient proof, the experience of only ten or twelve years on any one farm. But while admitting the insufficiency of such testimony, I assert that so far my experience decidedly supports my position. My principal farm, until within some four or five years, was subject in a remarkable degree to the common mild autumnal diseases of our low country. Whether it is owing to marling, or other unknown causes, these bilious diseases have since become comparatively very rare. Neither does my opinion in this respect, nor the facts that have occurred on my farm, stand alone. Some other persons are equally convinced of this change on other land as well on mine. But in most cases where I have made inquiries as to such results, nothing decisive had been observed. The hope that other persons may be induced to observe and report facts bearing on this important point has in part caused the apperance of these crude and perhaps premature views.

Even if my opinions and reasoning should appear sound, I am aware that the practical application is not to be looked for soon; and that the scheme of using marl in towns is more likely to be met by ridicule, than to receive a serious and attentive examination. Notwithstanding this anticipation, and however hopeless of making converts either of individuals or corporations, I will offer a few concluding remarks on the most obvious objections to, and benefits of the plan. The objections will all be resolved into one—namely the expense to be encountered. The expense certainly would be considerable; but it would be amply compensated by the gains and benefits. The general use of marl as proposed for towns, would serve to insure cleanliness, and purity of the air, more than all the labors of boards of health and their scavengers, even when acting under the dread of approaching pestilence. Secondly, the putrescent manures produced in towns, by being merely preserved from waste, would be increased ten-fold in quantity and value. Thirdly, all existing nuisances and abominations of filth would be at an end, and the beautiful city of Richmond (for example) would not give offence to our nostrils, almost as often as it offers gratification to our eyes. Lastly, the marl after being used until saturated with putrescent matter, would retain all its first value as calcareous earth, and be well worth purchasing and removing to the adjacent farms, independent of the enriching manure with which it would be loaded. If these advantages could indeed be obtained, they would be cheaply bought at any price likely to be encountered for the purpose.

ON BREEDING FOR A DAIRY STOCK.

From the New England Farmer.

The subject of breeding for a dairy stock, is one of a good deal of interest at this time. Inquiries are frequently made in conversation which show this to be the case. In the present state of our knowledge such questions as the following appear to the writer not at all too elementary.

1. What is meant by a particular breed of cattle?
2. Are there one or more breeds of cows known, by long trial, to be deep milkers?
3. To what extent is *breed* to be relied upon in the selection of a stock for milk?

I propose to make a few suggestions by way of answer to these questions.

There is another which I shall say something upon in another paper with your permission, viz.

On what else, *besides breed,* depends *deep milking?*

It is nothing new to say that the object of breeding (in a technical sense,) is to perpetuate in the progeny, the form, constitution, and particular qualities of one or both the parents. But what I wish to ask attention to, and to enforce in this communication, is the very important fact—that the longer any distinguishing quality, mark, or peculiarity, can be traced back in the ancestry, the more deeply will it be fixed in the descendants; predominating, or taking the place of other qualities, of more recent standing in either of the parents.

A particular cow may chance to be a fine milker, but if the parents, for some generations, were not remarkable in the same way, her heifer calves will not probably be good milkers—at least no dependence can be placed upon them. If the sire is of a pure milk stock the chances are very much increased of course.

It is not too much to say from experience, here and in England, that of all the varieties of cows, designated by the terms, Short Horns, Long Horns and Hornless—or by the names, more limited in their application, as Devon, Hereford, Holderness, Suffolk, Denton, Bakewell, Alderny, &c.—no one of them has been found to *give uniformly,* or *generally,* more or better milk than any other. The evidence before the public, abroad and at home, is contradictory.

There have been individual instances of extraordinary milkers among all—and I may go so far as to say *families,* of extraordinary milkers, among all.

It has been too often taken for granted, that a good cow will produce good calves without inquiry into her parentage or that of the bull to which she is sent—and prejudices have been raised in favor of marks and certain appearances, in such an animal, which have no necessary connexion, or none at all, with her faculty as a milker—and such marks have been allowed to determine the choice of another cow as infallible signs of a good one. The most prevalent popular token now is *the small head and short horns.* This is so far a good sign, as that the smaller the refuse parts, the

nearer will be the approximation to perfection in the more valuable parts, whether for beef or milk—and this is all. So much has been so satisfactorily proved by the conclusive reasonings of Mr. Cline, the eminent anatomist, in the essay published by him a long time since.*

The *Holdernees Breed* have the *small head* and *short horns*; but they are esteemed in England much better fitted, in general, for the shambles than for the dairy. An established dairy stock might, no doubt be raised from them by a careful selection of individuals, *male* and *female* from a *milk family*. But it would be too much to say of so large class as the Durham, Denton or Hereford, though all *short horns*, that bearing either of those names, they may be relied upon as good milkers, and to produce uniformly good milkers.

If the experience of the country will not bear the writer out in this remark he will be glad to find the dairy stock so much in advance of his opinion.

The Devon Cows are not considered in England to be so good for milk as some other kinds. And yet Mr. Coke, the great Norfolk farmer, sent to a friend in Maryland several years ago, a number of Devonshire cows, bred by himself, which were remarkable for quantity and quality of milk. They were bred on the side of both male and female we pursume, from animals whose progenitors were distinguished for this same quality: and he frequently crossed the blood of the Devons with any of the several kinds of Short Horns, whose descent, from an equally good stock for milk, had not been so well guarded, this same family would in a few generations have given evidences of material depreciation.

The truth really is, that we have yet the work to do to establish a pure milk breed.

To accomplish this, we must have a class of farmers who shall be *professed breeders* of a dairy stock—they will employ no bulls but such as come of good cows, they will raise no calves but from first-rate cows. They will keep the heifers for some generations, sending off to the butchers such as turn out indifferent milkers; as some there will be, in whom the faults of remote parentage will be found to linger. A herd thus carefully purged, and finally, after a few years, exhibiting a uniform character *for milk* in the young, as *they come in*, will prove a lasting and sure source of increasing profit to the skilful, intelligent breeder and an immense gain to the country.

The writer would ask, suppose a young farmer at the present moment is about to stock a milk-farm and is willing to pay the full value of *good cows*—good, we mean *as breeders*—where shall he go for them, in New England? Where shall he be sure to find an established milk breed that will not disappoint him? He will find *improved* breeds enough—but who will venture to insure him that the improvement will not be found to consist as often in adaptation to the shambles as to the dairy?

The idea suggested, whether well or ill founded, let others judge, is that we have not yet a pure *milk-stock*, that is, a stock descended for many generations from none but fine milkers. Some may think that the art of breeding cannot be carried so far as to secure a uniformity of excellence in this particular quality in the progeny. The answer can only be that they have attained to that degree of perfection in England—that for half a century *thorough breeders*, have been successful in this particular as in others. It is gratifying to be able to state any one thing on this most important subject, entitled to rank as an axiom and of a truly scientific character.

We say that thorough breeders have been entirely successful in England. Not that the farmers, generally in England have reached that degree of excellence. This would be far from the truth. All that is true even there, is the invaluable fact that particular families of milch cows are there known to transmit their peculiarity, as great milkers, with uniform certainty, to their progeny. This fact is as valuable, for our instruction and example, as if the same thing were true of all the milch cows in England. On the other hand, let the following statement have its due weight, going to show, as it does, that it is of some consequence for breeding from what family an animal derives its descent. "Mr. Woodward of Birlingham Worcestershire, England, purchased *twelve deep milking* Yorkshire cows without *pretensions to breed, or disposition to fatten*—with these cows he used a *high-bred* Hereford bull—and in the progeny lost the dispositon to milk which the mothers had; acquiring that *of laying on fat*, which was the distinguishing merit of the family to which the bull belonged.* Here is a striking case, where *high blood* enabled one of the parents to propagate his own peculiar excellence, and to prevent the transmission of the peculiar excellence of the mothers—viz their tendency to be great milkers; because this quality was accidental in them and not derived from a select ancestry, and therefore not firmly established in the constitution.

* Massachusetts Agricultural Repository.

DRAINING LAKES IN HOLLAND.

The states of the provinces of Holland opened their session on the 7th instant. The governor, in his speech, informed the assembly, that a plan for draining the Lake of Haarlem and the Bylmeer was under consideration. He concluded by holding out a confident expectation of this great undertaking being accomplished. The lake of Haarlem, which communicates with the Zuyder-Zee by the river Y, is extensive, but not deep; it is about 14 miles long, and from 7 to 10 broad. According to tradition, it was formed in the year 860, at the same time that the Rhine was intercepted by the formation of sand banks near Catwyck; but some persons who have investigated the subject, are of opinion that this event must have taken place at a period considerably more recent. It is stated in old chronicles, that an irruption of the sea destroyed at once 17 villages; and according to accounts published not many years ago, vestiges of habitations were still to be seen. There is a popular story of a nobleman who resided in this part of Holland escaping from the great inundation, in consequence of observing a marine fish in one of the lakes of his estate. He hence concluded, that the sea was undermining part of the coast which served as a bulwark against it; and immediately removed with his family. A contract is concluded with regard to the Bylmeer, and the works are to commence next spring.

* Prize Essay of the Rev. Henry Berry.

QUALITIES OF SOILS AND SUBSOILS.

Extract from Marshall's Rural Economy of Norfork, (England.)

A singular uniformity of soil prevails throughout this country: there is not, perhaps, an acre in it, which does not come under the idea of a SANDY LOAM.

Its quality, however, varies widely, both as to texture and productiveness. The northern part of the district abounds with barren heaths and unfertile enclosures; while the southern Hundreds are principally covered with a richer, deeper, highly productive soil.

The soil, in general, however, may be termed shallow: perhaps six, perhaps five, inches may be taken as the medium depth.

Immediately under the cultivated soil, a hard crust—provincially "the PAN"—occurs universally; and, under this, substrata of various qualities: an unfathomable ocean of *sand* may be considered as the prevailing substratum. In some places a hungry *gravel*, but more frequently an absorbent *brick earth*, is the immediate SUBSOIL. *Marl* sometimes rises to near the surface, but seldom so high as the *pan*.

This seems to be universally considered as a distinct something, poisonous in its nature, and partaking neither of the soil nor the subsoil. It is not my intention to ridicule this received opinion; it may be well founded; but, to me, the pan appears to be a production not of nature, but of art; or, to speak more accurately, a consequence of the Norfork culture carried on, time immemorial, with the Norfork plough;—whose broad flat share being held invariably in a horizontal position, and (unless in fallowing,) invariably at the same depth, the surface of the subsoil becomes formed, by the action of the share, the pressure and sliding of the heel of the plough, and the trampling of the horse into a firm even floor, upon which the soil is turned and returned, in the same manner it would be, if spread on a floor of stone, or other material.

But be this as it may, and whether the pan be a natural or a factitious production,—it is a fact well established, that breaking it up by ploughing below the accustomed depth, is very injurious to succeeding crops.

Two reasons may be offered in explanation of this effect; the pan, year after year, and, perhaps century after century, has been a receptacle of the seeds of weeds; which, by being trodden or otherwise pressed into it have remained there, locked up from the sun and air, and thereby deprived of the power of vegetation. But no sooner are these seeds released from their confinement by being brought to the surface with the plough, than they vegetate in myriads, to the annoyance of the crop.

The other reason is this:—the firm close contexture of the pan renders it in a degree watertight; it is, at least, a check to the rain-water, which sinks through the soil; prolonging its stay in the sphere of vegetation. But the pan being broken, the filter is no more; and the rain, which is not immediately retained by the soil, escapes irretrievably into an insatiable bed of sand,—or some other absorbent subsoil.

For, if we except a few quicksands, which occur on the margins of meadows, and the peat bogs which occupy their areas, there is not, in the district an acre of retentive SUBSOIL.

WORKING AND FEEDING HORSES.

Five horses are here called "a teamer, and are usually placed under the care of one "teamerman;" who, in more leisure times, ploughs with two of them in the morning, and with other two in the afternoon; but, in general, a laborer, or a boy, works one pair of them while the teamerman works the other pair, two journeys a day; having always, in this case, one horse at rest.

But in seed time more particularly in "barley feel," the fifth horse goes to harrow; every horse upon the farm going to work at six or seven in the morning, and stays till twelve; goes out again at one or two, and remains at work till six or seven.

In a wagon upon the road five horses are universally in use.

Whether upon the road or on the farm, the common practice is for the horses to trot with empty carriages.

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The keep of horses in Norfolk, notwithstanding the work they go though, is less expensive than that of other places, where large unwieldy horses seem to be kept for state, rather than for labor. This, though prevalent in many well cultivated districts, is an evident absurdity. There may be cases, in which heavy loads are to be drawn short distances, and where the number of horses is limited, as in London; in which cases, heavy powerful horses may be eligible; but, from the observations I have been able to make, a compact horse is much fitter for the varied employments upon a farm; and, with respect to keep, a main consideration in the choice of a farm horse, the advantage is greatly in favor of small horses. The present breed in Norfolk, still retaining a considerable portion of the original blood, is kept at half the expense at which many farm horses in different parts of the kingdom, are supported.

In the leisure months of winter, barley straw is, in general, their only rack meat; and through winter and spring, they are supported upon it; except, perhaps, in the hurry of barley seedtime; against which a reserve of clover hay is made; provided the teamerman does not make away with it before that time. A Norfolk farmer has a similar difficulty in preventing his men from stealing hay, as those of other countries have to keep them from pilfering more than their allowance of corn.

I met with one instance, in which a judicious regulation was made, with respect to horse hay. At Michaelmas, the master sets apart what he considers as a sufficient quantity to last to the close of barley seedtime. This allowance he consigns wholly to the care of his men; who never fail to husband it in such a manner as to have the necessary reserve at barley feel; whereas before he fell upon this regulation, horses were either worked down to skeletons, or he was obliged to buy hay for them at that season.

With respect to corn, a bushel each horse, a week, is, in the busiest season, considered as an ample allowance; in more leisure times, a much less quantity suffices.

Oats are the usual horse corn; but barley, when cheap or unsaleable, is sometimes given to horses. In this case it is generally "*malted*;" that is, steeped, and afterwards spread abroad, for a few

days, until it begins to vegetate; and, in this crisis, is given to the horses. It is thought to be less heating in this state, than it is when given to the horses in its natual state.

Chaff is universally mixed with horse corn; the great quantities of corn grown in this country, afford, in general, a sufficiency of *natural* chaff; so that *cut chaff* is not much in use: the chaff, or rather the awns, of barley, which in some places, are thrown as useless to the dung hill, are here in good esteem as horse provender. Oat chaff is deservedly considered as being of a much inferior quality.

The summer keep of horses, is, almost wholly, clover:—some few tares are grown, but the quantity is inconsiderable.

Soiling horses, in the stable, is not here a practice; except for baiting in the day time; the horses being universally kept out at night; and, generally, in clover lays.—[*Ibid.*

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BUCKWHEAT.

Buck is an object of the Norfolk culture, in a twofold light. It is propagated as GRAIN and as MANURE: and it will be proper to view it in these two lights. However, the main intention of its propagation, whether as a crop, or as a melioration of the soil, being the same; namely, the cleaning of foul land; it will be convenient to keep the two objects in nearly the same point of view.

1. With respect to SPECIES, there is only one; this grain having not yet, I believe, run into any *varieties*, sufficiently striking to have distinguishing names appropriated to them.

2. It is sown almost indiscriminately on all species of soils; except that light poor land has the preference; indeed, it is to this species of soils that buck seems most especially adapted.

3. It likewise SUCCEEDS every species of crop; the state of the soil, as to foulness and poverty, being generally more attended to than either the nature of the soil or the crop it bore last.

4. The soil process depends upon the state of the soil, and the intention, jointly: if the soil be tolerably clean, and the buck be intended to be ploughed under as a manure, it is sown on one ploughing; but in general, the ground is broken, as for barley or peas, to forward the fallow, and secure a crop.

5. The seed process is the same for both intentions; excepting that, for a crop, the seed is sown first; namely, immediately after barley feel: and that intended to be ploughed under, is sown as soon afterwards as the ground is in a state fit to receive the seed. It is universally sown above furrow. The quantity of seed six pecks to two bushels an acre.

6. No vegetation process takes place; the growth of buck is so rapid as to outstrip and smother almost every species of weeds; an excellency peculiar to this crop. * * * * *

Notwithstanding it is highly probable that there is more buck grown annually in Norfolk, than in the other thirty-nine counties of the kingdom, it is all consumed in the neighborhood of its growth It is the universal food of swine and poultry; both of which it fats quickly and well. It is sometimes crushed for pigs, and sometimes given to them whole: in this case, however, some judicious husbandmen mix a few oats or peas with it, in order that the swine may grind it down the more effectually, and thereby prevent its passing through them whole. * * * * * *

Wheat after Buck ploughed under.—This is a favorite practice among good farmers; and the Norfolk ploughmen perform the operation of ploughing the crop under, in a masterly style.—They sweep it down by means of a brush or broom, made of rough bushes fixed to the front of the "fickle tow;" or fore tackle of the plough, between the wheels; so as to bear down the buck without lifting the wheels of the plough from the ground. To prevent this, when the buck is stout, it is first broken down by a roller, going the same way as the plough is intended to go. This operation is performed when the plants are in their fullest bloom.

The surface is, sometimes, harrowed and rolled after ploughing; sometimes left rough; the former is perhaps the most eligible management.

In either case, the soil remains in that state until after harvest, when it is harrowed and taken up a full pitch, across the warps.

At seedtime, it is harrowed—rolled—sowed—and usually gathered up into "narrow work," in the manner above described.—[*Ibid.*

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DECOYS FOR WILD DUCKS.

The lakes, and large pools, which abound in the southern Hundreds of East Norfork, are the nurseries of innumerable flights of "wild fowl," of various species, but principally ducks; which are taken in great numbers in decoys, formed on the margins of these waters; and which, in eligible situations, may well be considered as objects of rural economy.

Much judgment is requisite in forming and managing a decoy. A gentleman in this neighborhood had a person out of Lincolnshire to make one for him. But after a great expense of cutting pipes, fixing skreens, nets, &c. it proved unsuccessful. The pipes were too straight, too close and confined, and too narrow at the mouth; without any banks for the wild fowl to bask upon. Upon the whole, it was too much *like* a trap to be taken.

The leading principles of a decoy are these: The wild duck is a very shy bird, and delights in retirement. The first step, therefore, is to endeavor to make the given water a peaceful asylum, by suffering the ducks to rest on it undisturbed. The same love of concealment leads them to be partial to waters whose margins abound with underwood and aquatic plants: hence, if the given water is not already furnished with these appendages, they must be provided; for it is not retirement, alone, which leads them into these recesses, but a search after food also.

Nevertheless, at certain times of the day, when wild fowl are off their feed, they are equally delighted with a smooth, grassy margin, to adjust and oil their plumage upon. On the close pastured margins of large waters frequented by wild fowl, hundreds may be seen amusing themselves in this way: and, perhaps, nothing draws them sooner to a water than a conveniency of this kind: hence it becomes essentially necessary to success to provide a grassy shelving, smooth-shaven bank at the mouth of the pipe, in order to draw the

fowl, not only to the water at large, but to the desired part of it.

Having by these means, allured them to the mouth of the pipe, or canal, leading from the water to a tunnel net, fixed at the head of it; but hid from the sight among trees and aquatic plants; the difficulties now remaining, are those of getting them off the bank into the water, without taking wing; and leading them up the pipe to the snare which is set for them.

To get them off the bank into the water, a dog, (the more he is like a fox the better,) steals from behind a skreen of reeds, which is placed by the side of the pipe, to hide the decoyman, as well as his dog, until the singal be given. On seeing the dog, the ducks rush into the water; where the *wild fowl* consider themselves as safe from the enemy which had assailed them.

But among the wild fowl, a parcel, (perhaps eight or ten) of *decoy ducks* have mixed, and were, propably, instrumental in bringing them, with greater confidence, to the bank. As soon as these are in the water, they make for the pipe, at the head of which they have been constanly fed; and in which they have always found an asylum from the dog. The wild ducks follow; while the dog keeps driving behind; and, by that means, takes off their attention from the trap they are entering.

As soon as the decoyman, who is all the while observing the operation through peep holes in the reed skreen, sees the entire shoal under a canopy net which covers and encloses the upper part of the pipe, he shews himself; when the wild fowl instantly take wing; but their wings meeting with an impervious net, instead of a natural canopy formed of reeds and bulrushes, they fall again into the water, and, being afraid to recede, the man being close behind them, push forward into the tail of the tunnel net which terminates the pipe.*

This being the use of the pipe, its form becomes obvious. It ought to resemble the outlet of a natural brook, or, a natural inlet or creek of the principal water. The mouth ought to be spacious, and free from confinement, that the wild fowl on their first rushing into the water, and while they have yet the power of recollection, may be induced to begin to follow the tame ducks; and for the same purpose it ought to be crooked, that its inward narrowness, and nets may not, in the first instance, be perceived. The lower part of a French horn is considered as the best form of the pipe of a decoy.

One material circumstance remains yet to be explained. It is the invariable nature of wild-fowl to take wing with their heads toward the wind; and it is always imprudent to attempt to take them in a decoy, unless the wind blow down the pipe: for, while their enemy is to leeward of them, they have less scruple to go up the pipe, making sure of an escape by their wings. But, what is of still more consequence, if the wind set up the pipe, when they take wing under the canopy net, some of them would probably escape, (a circumstance always to be dreaded,) and those which fell again into the water, would fall, of course, with their heads toward the wind, and would, with greater difficulty, be driven into the tunnel.

This circumstance is so well known, by decoymen in general, that every decoy is, when circumstances will admit of it, furnished with three or four different pipes, pointing to distinct quarters of the horizon, that no opportunity may be lost on account of the wind.

For the Farmers' Register.

EXPERIMENT TO TEST THE POSSIBILITY OF WHEAT DEGENERATING INTO CHEAT.

October 20th 1832. A spot about twenty feet square on one side of a field of corn, was left out when all the adjacent ground was ploughed and sown in wheat three days before. Soil, a silicious loam, (which had been marled in 1820,) on a retentive subsoil, which by preventing the sinking of the water from rains, keeps the surface very wet through winter and spring. The surface of this part of the field is a very gentle slope, declining towards the north, and the lowest spot of the whole (and therefore the most exposed to water) is where the space was marked for this experiment. Their the surface becomes level. The whole field, including this spot, had been ploughed five or six inches deep last winter, for corn, and well cultivated, but not later than the beginning of July. All remained very clear of weeds.

The space was slightly smoothed by the broad hoe, merely to level the clods, but not broken any where an inch deep, and generally not cut at all. As the corn had been tilled level, and not hilled, the surface required but little smoothing. Wheat was selected for the trial which had passed through a cockle sieve, and of course was all either shrivelled, or very small grains if plump. Lines were slightly traced along the edge of a straight rod, (not more than half an inch deep,) and a few seeds varying from three to seven, were placed accurately at every six inches of the line, by notches on the rod made at those distances. The seed was carefully cleaned of every grain of cheat, spelt, and cockle. Half the square was thus planted in such rows six inches apart, and the remainder in similar rows twelve inches apart. For fear that even this very defective seed might not be bad enough to insure the change to cheat, one of the subscribers picked out a number of the most shrivelled and imperfect grains, all of which he is confident will bring cheat, if they are capable of producing any thing, which is very doubtful from their appearance. One of the rows was planted with these grains, four being carefully deposited at each distance of six inches. All the seeds were covered with abont half an inch of mould taken by the hand from the intervals between the lines; and the whole space was then slightly beaten over with the flat of the broad hoe.

About four feet width adjoning the square, and of similar unbroken corn land, was strewed broadcast with similar defective seed, and covered as shallow as possible.

The earth dry at this time, and in fine order for ploughing. The weather uncommonly warm for the last three days.

Present and assisting at the making of this experiment and undersigned Thomas Cocke and Edmund Ruffin of Prince George county, and William J. Cocke of Sussex—the first a believer and the second an unbeliever in the change of wheat

* I was told by the proprietor of a decoy, who is himself fond of the diversion, and whose veracity I have no reason to doubt, that he has, in this way, caught "nine dozen at a push."

to cheat, and the third undecided. It was our design in this experiment to bring into operation every cause to which this change is usually ascribed by different persons, namely, 1. imperfect seed—2. thick sowing—3. a wet soil—4. hard or unbroken soil—5. grazing or mowing, which is to be done next spring.

If any cheat or spelt, should grow in this square from any other seed, it cannot be mistaken for the product of the wheat we have planted, unless the plants should stand in one or more of the positions so accurately fixed by measured distances.

THOMAS COCKE.
EDMUND RUFFIN.
WILLIAM J. COCKE.

October 20th, 1832.

April 15th, 1833. The growth of plants on the square is very mean, (generally six or seven inches in height,) but few are living compared to the number of grains sown. Every row however has some plants living. Half the marked row where the worst seed was used, and as much of the one adjoining was cut down this day within an inch of the ground, and the parts so treated were also marked.

June 3d. We again carefully examined the experiment together, to know and report the final result. Not a single head of cheat or spelt is in the whole space. The cut plants have grown as tall, and are not perceptibly worse than the balance in the same rows. The row sown with the very imperfect grains, has a still more scanty growth than the others, but had twenty-four heads of wheat in its whole length; a few of these heads had not come out of the *boot*, and perhaps will not produce grain—but they were opened and found to be wheat, like all the rest which were out.

The adjacent parts of the field of wheat contain a few scattering stalks of cheat, and still fewer of spelt. The seed had been well cleaned, (though probably not perfectly,) by the hand-sieve.

THOMAS COCKE.
EDMUND RUFFIN.

Prince George Co. June 4, 1833.

SPEED OF MAIL COACHES AND KEEP OF THEIR HORSES IN ENGLAND.

Extract from the Quarterly Review.

But to return to fast work: the Edinburgh mail runs the distance, 400 miles, in forty hours, and we may set our watches by it at any point of her journey. Stoppages included, this approaches eleven miles in the hour, and much the greater part of it by lamplight. The Exter day coach, the Herald, from the Saracen's Head, Snow Hill, runs over her ground, 173 miles,* in twenty hours—admirable performance, considering the natural unevenness of the country through which it has to pass. The Devenport mail does her work in first-rate style, 227 miles in twenty-two hours. In short, from London to Cheltenham, Gloucester, Worcester, Brimingham, Norwich, or any other place, whose distance does not much exceed one hundred miles, is now little more than a pleasant morning drive. We say *pleasant*, for this extraordinary speed is *not* attained, generally speaking, by putting animals to any thing like cruel exertion. A fast coach has nearly a horse to every mile of ground it runs—reckoning one way, or 'one side of the ground.'* Proprietors of coaches, have at length found out—though they were a long time before they did discover it—that the hay and corn market is not so expensive as the horse market. They have, therefore, one horse in four always at rest; or, in other words, each horse lies still on the fourth day, thus having the advantage of man. For example, if ever we turn coach proprietors, or 'get into harness,' as the proper term is—which, as we have become fox hunters, is by no means impossible—we shall keep ten horses for every ten miles stage we engage to cover. In this case, eight horses only will be at work, four up and four down. If the stage be under seven miles, nine horses may do the work; but no horse in a fast coach can continue to run every day, the excitement of high keep and profuse sweating producing disease. In practice, perhaps no animal toiling for man, solely *for his profit*, leads so easy and so comfortable a life as the English coach-horse. He is sumptuously fed, kindly treated, and if he do suffer a little in his work, he has twenty-three hours in the twenty-four of luxurious ease. He is now almost a stranger to the lash, nor do we ever see him with a broken skin; but we often see him kick up his heels when taken from his coach, after having performed his stage of ten miles in five minutes under the hour. So much for *condition*.

No horse lives so high as a coach-horse. In the language of the road, his stomach is the measure of his corn;—he is fed *ad libitum*. The effect of this is visible in two ways—first, it is surprising to see how soon horses gather flesh in this severe work—for there is none more severe while it lasts; and, secondly, proprietors find that good flesh is no obstacle to their speed, but, on the contrary, operates to their advantage. Horses draw by their weight and not by the force of their muscles, which merely assist the application of that weight; the heavier a horse is then, the more powerful is he in his harness; in short, it is the weight of the animal which produces the draught, and the play and force of his muscles serve to contiuue it. Light horses, therefore, how good soever their action, ought not to be put to draw a heavy load, as muscular force cannot act against it for any length of time.

The average price of horses for fast coaches may be about £23. Fancy teams, and those working out of London may be rated considerably higher than this; but taking a hundred miles of ground, *well horsed*, this is about the mark. The average period of each horse's service does not exceed four years in a fast coach—perhaps scarcely so much. In a slow one we may allow seven; but in both cases we are alluding to horses put to work at five or six years old. Considerable judgement is necessary to the election of horses for fast work in harness; for if they have not action which will command the pace they are timed at, they soon destroy themselves. For a wheel horse he should have sound fore legs, or he cannot be depended upon down hill.

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* From Calais to Paris is the same distance; the Diligence takes at least 48 hours in summer, and from 50 to 60 in the winter. The Exeter mail is allowed 18 hours from London to Exeter, the Paris mail from 28 to 30 hours from Calais to Paris and this is reckoned quick work.

* For example, from London to Shrewsbury is 158 miles, and the number of horses kept for the Wonder coach is 150.

Good hind legs and well spread guskins are also essential points in a coach-horse—the weight or force applied proceeding from the fulcrum formed by the hinder feet. The price we have named as the average one for such animals may appear a very low one: but we must remember that to be a hunter, a horse must have length of shoulder, length of frame, well placed hinder legs, and a well-bitted mouth—whereas, without any of these qualities he may make an excellent coach-horse—and hence the value of the coach market to our breeders. Blemished horses also find their way into coaches, as do those whose tempers are bad; neither is a blind horse, with good courage, altogether objectionable now the roads are so level.

It may not be uninteresting to the uninitiated to learn how a coach is *worked*. We will then assume that A, B, C, and D, enter into a contract to *horse* a coach eighty miles—each proprietor having twenty miles; in which case, he is said to *cover both sides of the ground*, or *to and fro*. At the expiration of twenty-eight days, the lunar month, a settlement takes place, and if the gross earnings of the coach should be £10 per mile, there will be £800 to divide between the four proprietors, *after* the following charges have been deducted, viz: tolls, duty to government, mileage (or hire of the coach, to the coachmaker,) two coachmen's wages, porter's wages, rent or charge of booking-offices at each end and washing the coaches. These charges may amount to £150, which leaves £650 to keep eighty horses and to pay the horse-keepers, for a period twenty-eight days; or nearly £160 to each proprietor for the expenses of his twenty horses, being £2 per week, per horse. Thus it appears, that a fast coach, properly appointed, cannot pay unless its gross receipts amount to £10 per double mile; and that, even then, the *horser's* profits depend on the luck he has with his stock.

In the present age, the art of mechanism is eminently reduced to the practical purposes of life, and the modern form of the stage-coach seems to have arrived at perfection. It combines prodigious strength, with almost incredible lightness, not weighing more than about eighteen hundred weight; and being kept so much nearer the ground than formerly, is of course considerably safer. Accidents, no doubt, occur, and a great many more than meet the public eye: but how should this be otherwise, when we take into account the immense number of coaches on the road, a great portion of which travel through the night, and have all the varieties of our climate to contend with? No one will assert that the proprietors guard against accidents to the utmost of their power—but the great competition they have to encounter is a strong stimulant to their exertions on this score. Indeed, in some respects, the increase of pace has become the traveller's security.* Coaches and harness must be of the best quality; horses must be fresh and sound, and coachmen of science and respectability can only be employed. In fact, to the increased pace of their coaches is the improvement in these men's moral character to be attributed. They have not time now for drinking, and they come in collision with a class of persons superior to those who formerly were stage-coach passengers, by whose example it has been impossible for them not to profit in all respects. A coachman drunk on his box is now a rarity. A coachman, *quite sober* was even within our memory still more so. But let us press this question a little further: do the proprietors guard against accidents to *the very extent of their ability?* We fear not: too many of them, to touch only one point, allow their coachmen to omit the use of the hand or end-buckle to their reins, which, to our own knowledge, has lately been productive of innumerable accidents. This is *new*, and it is a mere piece of affectation, and should be put a stop to; for surely, if a coachman fancies he has not time to 'pin his ribbons' before mounting the box, he can do so after having proceeded a short distance on his stage; and he cannot say he has not time to unbuckle them before he come to the end of it. It is evident; that with reins unbuckled at the ends, should either of them drop out of his hand, all command over his team is gone. Moreover, in the hands of the best coachman, a wheel-horse will now and then drop, and should he not, fortunately in this case, *be dragged on the ground, so as to stop the coach*, up he jumps, and, expecting the whip, rushes forward his head loose, his rein having been drawn though the coachman's hand. Had it been buckled at the end, such an occurrence could not have happened; and if, after our warning, damages are sought for on this score, coach proprietors may depend on it they must be prepared to smart.

That, in fact, nineteen accidents in twenty are the effect of want of proper precaution, cannot be denied.—Coachmen, it is true, are not theoretical philosophers, but experience teaches them, that if they drive fast round corners, the centre of gravity must be more or less disturbed by thus diverging from the right line; and if lost, *over she goes*, yet a great number of the overturns that occur happen exactly in this way. Why then are not coachmen strictly enjoined by their employers to avoid so gross an error? But it is in the act of descending hills that the majority of catastrophes take place; and the coachman needs not book learning to enlighten him so as to the *wherefore*. Let him only throw up a stone, and watch its descent. If it falls sixteen feet in the first second, it will fall three times that distance in the next, and so on. Thus it is with his coach; the continued impulse it acquires in descending a hill, presses upon the wheel-horses, until at last it exceeds their powers of resistance.—In short, they have a new force to contend with at every stop they take. But this is not all. Instead of checking the active force of his coach before she begins to move downward, he too often adds that to the fresh impulse she acquires on her descent. Every coachman, who has a regard to the safety of his own neck, should check the velocity of his coach at the top of every hill; which, to use the language of the road, is termed 'taking a hill in time.' He may, in that case, if his harness be sound, drive his coach down any hill, now found in our roads, with ease; and, when a certain way down it, may increase his pace, with perfect safety, to meet the opposing ground at the bottom. With heavily-laden coaches, we prefer this to the drag-chain—by which hundreds of them have been pulled over—and which is a great check

* To give one instance—the Worcester mail was one of the slowest on the road and the oftenest overturned. She is now fast, and reckoned one of the safest in England.

to speed, too, as the *momentum* cannot be taken advantage of, in continuing the motion of the coach when she brings the horses to their collars again.

The question often arises,—is there any danger in galloping horses in a coach, on perfectly level ground? Under certain circumstances there is. For instance, if there happen to be two horses at wheel, which take unequal strides in their gallop, their action will be felt by the coach—they being so near to her—and lateral motion may be produced by which her equilibrium may be destroyed. When a coach once begins to swing, a little thing will upset her—even passing over a small stone—as the faster she goes on level ground, the more weight is thrown upon her fore wheels. Neither is a good road a security to her; on the contrary, the harder the surface of it, the more danger, there being nothing to hold the wheels to the ground. If, however, it were possible to make the stride and draught of four horses quite equal, their increased speed would have but little effect on a coach, upon tolerably level ground; which is proved by her being quite steady in ascending a hill, at ever so quick a rate, when every horse is at work. This shows the necessity of putting horses well together.

The worst of accidents, and one which, with the present structure of coaches, can never be entirely provided against, arises from broken axletrees and wheels coming off on the road. It was but the other day that a passenger's leg was fractured by the upsetting of the Dart, Brighton coach; driven by William Snow, (a proprietor) one of the steadiest and most experienced coachmen of the present day, owing to the snapping of the axletree.—There is certainly something startling in the reflection, that whenever we travel by a coach, we are liable to this occurrence, which must happen if the weight above be too great for the sustaining power below; and for this reason, the mails are safer than stage-coaches, as not loading so heavily. Every thing that can be done to prevent the *snapping* of the axletree has now been adopted, we think, by our coach-builders. In case it does break, what is called the *idle* wheel, in addition to the active wheel, is the only security against an upset; but as this somewhat adds to the weight of a coach, the use of it has been abandoned. Accidents, then, are always to be apprehended by travellers from this cause;—the loss of wheels is another; and until an act of parliament enforces the use of the patent box, or the screw nut, so as to trust no longer to the common linchpin, it will remain a third.*

On the whole, however, travelling by public conveyances was never so secure as it is at the present time. Nothing can be more favorable to it than the build of the modern coaches. The boots being let down between the springs keep the load, consequently the centre of gravity, low; the wheels of many of them are secured by patent boxes; and in every part of them the best materials are used. The cost of coaches of this description is from £130 to £150, but they are generally hired from the maker at from 2½*d.* to 3*d.* per mile.

The common height of the stage coach wheels of the present day, is as follows:—the fore wheels three feet four inches, the hinder four feet eight inches. As the former turn round so much oftener than the latter, and also bearing more weight, they require to have their fellies fresh wrung about every five weeks; whereas, the latter will stand good for two months, or more. The strength of a wheel depends greatly on the attention paid to the arrangement and framing of the spokes. In common wheels they are framed regularly and equally all round the thickest part of the nave, the tenons of the spokes being so levelled as to stand about three inches out of perpendicular, by which is produced the *dishing* wheel. This dishing, or concave wheel, is not essential on our present rutless road, and perpendicular wheels are preferable on level ground. The best wheels we know of, are those under our mail-coaches. The spokes are framed somewhat differently into the nave, which is made rather larger than is usual for common coach wheels and every other spoke is framed perpendicular to the nave. Hence, the mortises to receive them in it are not made in a parallel line round it, but stand as it were in two different parallels—one without the other—by which means greater solidity is given to the nave, and an immense addition of strength to the wheel. What is called the patent hoop, always used in stage-coaches, having the iron tire drawn into one complete ring—is not put on these wheels, but the common strokes, as they are called, forged and hammered to the sweep of the rings, and in length equal to those of the fellies, are put on red hot, and well secured by rivetted nails. The mail fore-wheel is somewhat higher than that of the stage-coach, which is an advantage. Low fore-wheels place the axle so much below the level of the wheel-horses' breast, that they have not only the carriage to draw, but also part of its weight to bear. This weight distresses their hams, stifles, and hocks, and accounts for coach-horses being soon unfit for the saddle. It is evident that attention to these points is necessary in putting horses to a coach; and when the fore-wheels are low, the wheel-horses should have as much length of trace as can be given them, for the line of traction should be as nearly even with the draught of the horse as we can make it.*

It requires, also, some art to load a coach pro-

* The only linchpin that can be relied on, is the wooden one; which, together with the screw nut, is used in the French diligences. It is made of heart of oak; and being once driven through the eye of the arm, cannot be drawn out again, without cutting off the bottom of it, as it swells to a size which prevents its returning the way it went in. *There is no dependence on iron linchpins.*

* Thus it is with a farmer's wagon. When the shaft-horse is standing at rest—allowing two degrees of an angle for that position—the point of the shaft is nearly even with the top of the fore-wheel, but when the horse exerts his strength to move a load, he brings his breast so much nearer the ground that the line of draught is almost horizontal, and in a line with its centre. The trace of a coach-horse, *when he stands at rest*, is also *oblique* to the horizon, and must be so with low fore-wheels; but it approaches the horizontal when he is at work, and the nearer it approaches to it the better. Horses draw up by their weight, and not by the force of their muscles: the hinder feet, then, being the fulcrum of the lever by which their weight acts against a load when they pull hard it depresses their chests—thus increasing the lever of its weight and diminishing the lever by which the load resists its efforts.

perly. A wagoner on country roads always puts the greater weight over his hinder wheels, being the highest,—and he is right, for he has obstacles to meet, and the power necessary to overcome them diminishes with the increased diameter of the wheel. On our turnpike roads, however where there is now no obstacle, the load on a coach should be condensed as much as possible, and the heaviest packages placed in the fore-boot. Indeed, all the heavier packages should be put in to the boots, and the lighter ones only on the roof. A well loaded coach is sure to follow well, and is always pleasant to ride in; and as a weak child totters less when it has a weight on its head, coach-springs break less frequently with a heavy load than with a light one.

Allowance is made for the retarding power of friction in all kinds of machinery, and of course it is not overlooked in carriages. The coachman sees its effects every time he passes the drag-chain on his wheel, which merely decreases the velocity of his coach, by increasing the quantity of friction. Common sense must likewise instruct him, that, when two bodies are rubbing against each other in opposite directions—as the arm of an axletree and the iron box of a wheel—the smoother these bodies can be made, the less of course is the friction. As economy in the expense of power is one of the chief objects of a mechanic, it is not to be wondered at that great pains have been taken in the construction of the axles aud boxes of carriages.

To Mr. Collinge are we chiefly indebted for his patent cylindrical axletree and box, which have stood the test of many years, and given universal satisfaction—for the silent and steady motion they impart to the wheel—for their great strength and durability—and for carrying oil several thousand miles without the necessity of replenishing it. They are turned upon a lathe, case-hardened, and rendered as smooth on the surface as it is possible, in the existing state of the art, to render them. But as the expense of these boxes is too great for stage-coaches, patents have been taken out for others of a less costly nature, which answer extremely well, and have long since been in use on all coaches that run from the Bull and Mouth and many others besides. *No stage-coach can be safe without the patent boxes*, as they are termed, but there is a prejudice amongst proprietors against them. They certainly add to the cost, and also to the weight of the coach, and by preventing the wheels from escaping any obstacle that may present itself—the consequence of their being air-tight—they wear out rather sooner than when used with the common axle. Their general adoption, however would be a great safeguard to the public, as well as of considerable assistance to trade. In the mail-coaches, the boxes are of a different construction, and owe their safety to four bolts, which pass completely through the nave of the wheel, having a square shoulder on the back of the nave, with screws and nuts on its front. We have no hesitation in saying, this is the best wheel ever put under a coach; and of course, Mr. Vidler, the contractor for the mails, has a patent for it. The mails could never do their work with the common axle and box.*

*An improvement on all the patents yet brought forth, was some time since attempted by two spirited coach-makers in London, but we have not heard of its success. Its object is to diminish draught in two distinct ways—first, by reducing the bearing parts, and thereby lessening friction; and secondly, by diminishing the "dead hug," as it is termed, which is always an attendant on the cylindrical arm and box. It substitutes a square, instead of a cylindrical box, in which the cylindrical axle or arm works. This is made to fit on each of the four sides as true and as air-tight as if it were a complete circle; and if the four different bearings are but one-eighth of an inch each, it is apparent that there is but half an inch of surface for the arm to oppose or work against, in each axle—and so on in proportion to the size of the bearing. Nor is this all; those parts or angles, not touched by the arm—as may be seen when the box is revolving,—serve as reservoirs for oil, affording a constant supply. The nose of the arm is protected by a circular end, ground on to form the nicest fit, and prevent the possibility of the smallest particle of gravel finding its way into the box.

BERWICKSHIRE, UNDER THE OLD AND NEW SYSTEMS OF FARMING.

From the (Edinburgh) Farmers' Magazine.

I will here, sir, quote an example with which you are well acquainted, and which is both a decisive and instructive one. It is that of Berwickshire, which is a merely agricultural district.—This country, now so eminent in the history of improved cultivation, was, about seventy or eighty years ago, farmed chiefly by petty tenants; whose farms were cultivated by themselves and their children; what was then the state of the country? Its fine soil was miserably managed. Its crops, of course, were poor, except on some *infield* lands, on which all the manure and most of the care were bestowed. Its cattle and its instruments of culture were alike wretched. The farmers' houses were in general hovels, which too frequently displayed little more than dirt and poverty; and amid much health, there was much that was uncomfortable. Ten or a dozen stout children, with little or nothing to do except in seed-time and harvest, (the lasses, during the rest of the year, idling away their time at the spinning wheel, and the lads spending the greater part of the day at the smithy and at other places of resort for rustic idlers,) lived upon the poor tenant and kept him in poverty. In short whatever the patriotic reminiscences of the older folks of those happy times of little farms may be, the whole was in reality, a scene of misemployment, unproduction, and poverty, with much discomfort.

But the improved system began. Farms instantly grew larger,—farmers with capital were selected,—cultivation was now carried on with skill, vigor, and spirit not before known, and proved a copious source of wealth both to farmer and land-holder. The persons not necessary to carry on the business were forced to migrate from the country to towns, and as there are no large towns in the country, to those out of it.† Thus, instead of accumulating where they were not wanted, they accumulated where they were wanted, and produced wealth to themselves as well as

† This is the cause why Berwickshire, though, under the improved system of farming, it produces as much, if not more food in proportion to its resident population, than perhaps any other county in the island. makes such slow progress in population. Between 1801 and 1811, its increase was nearly the slowest in the island, being not quite 1 per cent. Between 1811 and 1821, it however increased 8 per cent; but even this is less than half the average rate of the island.

to the community. By this migration, both the country which they left and the country which they joined were enriched under their respective circumstances. The farmers are now men of wealth, spirit, and agricultural science, and in every point among the first in Europe; while, for the care-worn petty farmers of former days, who were kept grovelling in poverty and dirt, we find *cotters* employed by the former, contented, tidy, respectable, and well to do.

The subdivision of Lands and Cabin System in Ireland.

If the same change, sir, were to take place in Ireland, why should not the same results follow? While the supernumeraries would augment the towns, and thus keep creating an additional quantum of employment according to a constantly increasing average; the cultivators left behind, from having a full quantum of employment, with the increase of the means, would gradually imbibe the spirit of saving, and with an increasing capital would become vigorous and scientific farmers, while the persons employed by them would be either house-servants properly fed and paid, or respectable cotters, who would feel they had a stake in the tranquility of the country.

In the infinite subdivision of lands, which obtains in most parts of Ireland, we have the great source of her poverty and of the disorderliness of so large a portion of her lower ranks. There are no doubt assisting sources, but this is the principal one; indeed, that to which most of the others owe their existence. And were it removed, all the rest would be found to be softened or diminished greatly. The lands are divided and subdivided into portions, that are utterly incapable of supporting an individual and his family. He is thus kept in a state of the most abject poverty. He gets into debt. His scanty furniture and clothes are seized, and he is turned out of his hovel a beggar. Where can he go to? His relations and friends can give him no assistance. They are most of them in as wretched circumstances as himself. Thus, in a state of misery and exasperation, and in his desperate condition reckless of consequences, as no change can be worse, he is ready to listen to the most atrocious suggestions. The grand object which he now cherishes, is revenge on those who have made his distress greater than it was before.

In such a state of society, how is it possible that an increase of population can produce its usual and natural effect? It tends only to subdivide the lands and the means of employment still further, without augmenting them. Increasing poverty must be the necessary results of such an unnatural state of things.

Even the potato, which is so admirable a root to a better organized population, becomes, from its estimable qualities to Irishmen, an additional source of poverty and distress. Being so productive, and of course so cheap a food, it diminishes the stimulus on the cabin-man to exert himself to get out of his wretched condition. And further, cheap as it is, instead of enabling him to save in his circumstances, it really diminishes his means of income, for it diminishes his power to charge. It enables him to subsist by the smallest quantum of employment; and thus he both impoverishes himself and his neighbors. The greater the variety of articles any individual, class, or nation uses, the higher must they charge; but then by creating more employment, the more capable are all the individuals rendered of paying the higher charge.

ON THE CULTURE OF CORN.

From the Southern Agriculturalist.

Dear Sir,—When I saw the annexed paragraph in a newspaper, I was induced to write to Mr. Megginson, and inquire his mode of cultivating a corn crop. I received, in answer, the subjoined letter, which I place at your disposal; with my best wishes for the success of your very useful journal. Respectfully, your obedient servant,

J. CLARKE.

"Mr. A. B. Megginson, manager upon a plantation in the county of Amherst, (Va.) raised the present season, on one acre of land, one hundred and eight and an half bushels of sound corn, and two of inferior quality. This acre received no other cultivation than the rest of the field. The same manager had frequently made one hundred bushels of sound corn, and some of inferior, upon an acre of land on Pleasants' Island, in the county of Goochland."

Buckingham, Va. March 24, 1832.

Mr. J. Clarke:

Sir,—Your favor of the 24th of January, I have just received, and am sorry it was so long reaching me; I, however, lose no time now, in giving you the information asked for, which I do with great pleasure in my lame manner.

I prepare my land for corn in the fall, if I can, with a two horse plough, by throwing it up into beds of five feet, (which is the distance I cultivate my corn rows apart, either upon high or flat land;) but, if out of my power to do it then, at any time before I commence planting. I drill altogether with a machine, or what we call a "corn planter," made for that purpose, and leave the corn thin or thick, according to the strength and moisture of the land. If remarkably rich, and sufficiently moist, I leave a stalk every six or eight inches apart; if less rich, but still of good quality, about twelve; and I think, two feet to one stalk, far enough apart for any land that will produce at all. In moist land I plant on the bed, and in dry thirsty land, in the sink or finishing furrow, by throwing down a little of each bed into the sink with a small plough, for the purpose of getting a bed to plant in. I plough our broken land horizontally, in order to hold as much moisture as possible for the crop, and also, to preserve it from washing rains. If I break it up in the fall, I plough it again just before I plant it, by reversing the beds, as I think it very important to prepare the land before we plant it. After planting, I keep it well stirred with a Coulter plough; (three fixed in a frame, for one horse to pull, that will always finish a row at the third, and very generally the second furrow, untils it gets large enough to bear the dirt from the mould-board, I then commence giving it my last ploughing with a small turning-plough, by running two furrows on each side of the corn, first and then commencing again, and finishing out the middle of the row. As soon as it will do to thin, hoe it, and then thin it, and if it should require it, hoe it again. I think we should stop working corn as soon as it will shade the earth enough to keep

other growth down, as I think it injurious to break the roots after the stalk is generally jointing.

I commence planting about the 10th of April, or as soon as I think the earth sufficiently warm to bring the seed up regularly, that it may all grow up together, as replanted corn is so much shaded by the first (upon my thick plan) that it seldom produces any thing.

For corn, we generally manure in the drill, owing to the scarcity of the article, or I should prefer its being spread over the land regularly; stable manure, or litter from a farm yard well rotted, is very strong, and should not be put in the drill too plentifully, as it has a tendency to fire the crop. I put a great or small quantity, according to the strength of the manure. I am very little acquainted with lime or plaster, as a manure.

I conclude my remarks, by wishing you success, upon the mode of cultivation. Very respectfully, your obedient servant,

A. B. MEGGINSON.

N. B. I use the Farmers Plough altogether, No. 3½, for two horses; No. 1, for one horse.

NATIVE GRAPES.

WOODSON AND CUNNINGHAM.

From the American Farmer.

Farmville, Prince Edward. Co Va.
December 11. 1832.

MR. SMITH:—While in this place to-day, I was looking over some of the late numbers of the Farmer, my attention was arrested by your editorial remarks on "Native Grapes," in No. 33.—The information there sought with respect to the "Woodson" and "Cunningham" grapes was requested at the hands of Dr. Norton, of Richmond, from whom you received specimens of those varieties. As I do not find any published reply to your queries in your subsequent papers, I hope you will not deem it intrusive, if I communicate what I have gathered on the subject. I shewed your article to Mr. Samuel W. Venable, a gentleman of this vicinity, who for several years past has paid much attention to the subject of grapes—having made a considerable collection of foreign and native varieties—and who has tried numerous experiments with those in question. I remember to have seen some time since in Prince, some general account of them, to whose work you can refer, as I have it not at hand; but from Mr. V. I learnt minutely their respective histories.

They are both, as far as has been ascertained, natives of this country—both supposed to be *seedlings* of the "Bland;" and the original stock of each is still standing and alive. Some of the reasons for this supposed orgin are:—that the "Bland" was generally and almost alone cultivated in the garden, and trained on trees in the yards of old settlements in this county—that no grape similar to them has been found in this region; that all the most valuable native varieties have been discovered in the vicinity of those farms where the Bland has been known to grow—and these too are conjectured to have sprung from seed dropped by birds, or in some such manner.

The "Woodson" grape received its name from Col. Charles Woodson, a citizen of this county, who was first its cultivator, and who has long been an amateur and spirited raiser of vines and other fruits. The parent vine, supposed to be more than fifty years old, is still growing on the farm of Mr. Isaac Read, near an old family mansion; in the garden attached to which, Bland grapes are remembered to have been raised at a very early period. The leaf resembles that of the "Bland" in form, and in almost every other particular, except that the furze on the under side is of a dark color. It stands on a high dry soil—climbing and turning itself about the branches of an oak, which is situated on the side of a hill. It is said to have been formerly very thrifty and prolific, although it has much declined in these respects from age and want of culture. The vine and fruit are both much improved by cultivation. Mr. V. informs me that he has about forty stalks in his vineyard; which are fine growers and highly prolific—having produced more abundantly than any grape which he cultivates—some of the bunches of the last season weighing three pounds. It buds late in the spring, is rarely injured by frost, is hardy if planted on a dry soil, will bear heavy pruning. The grapes ripen from the 10th to the 15th of October, and are not subject to rot. A little "domestic wine" has been made of them after the receipts of some of the old fashioned housekeepers in this county, which was pronounced quite good by those who, perhaps, do not plume themselves on being critical judges of such matters.

The "Cunningham grape," is so called from Mr. Jacob Cunningham, on whose farm it was first discovered. The parent vine, (about twenty years old) whose leaf is like that of the Bland except that the furze is of a *yellow* color, stands in a dry part of his garden, and at this time covers thickly both sides and the top of an arched frame about 50 feet in length, by 12 in height.* It was never pruned save of the slips which have been distributed for propagation, (of which those sent to Dr. Norton were a part,) and yet is very prolific. The stocks in Mr. Venable's vineyard are more so than those of any other grape which he cultivates, except the Woodson. Like the latter, it buds late in the spring, and of course but occasionally subject to frost—is thrifty and prolific, and ripens from the 20th of September to the tenth of October, much improved by cultivation and pruning. Wine has been made from it more frequently than from the Woodson—in body, smell and flavor nearly resembling Madeira.

It was first attempted here to propagate it by slips, though frequently without effect—then by grafting with some better success—and with layers easily. Mr. Venable succeeded with the slips as well here as with other native varieties, as he thinks by setting them out in November—those planted in the spring having failed. Another mode which proved successful in forty nine cases out of fifty, was setting out slips with but one bud, having both their ends hermetically sealed with tar. He has about eighty stocks in his vineyard. In the years 1828-9-30, a number were distributed in different parts of this state to ascertain the effect on them of different climates, situation and soil, from which, intelligence will probably be received in the course of the next season.

Perhaps it might not be entirely irrelevant, were I to give a slight sketch of Mr. Venable's vineyard. About the year 1827 he determined on making an experiment, to ascertain the practica-

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* A pillared shade. Qr.

bility of raising grapes in sufficient abundance and of suitable quality for making wine in this climate. For this purpose he selected two acres with a southern exposure on a slightly declining hill side. The holes in which the vines were planted were twelve feet apart, each way—a sassafras pole, about seven feet in height, standing by each vine, with laths extending from one to the other, on which they were trained from north east to south-west. There are in all, about one thousand stocks, chiefly procured of Messrs. Parmentier and Adlum, of which the most numerous are the Catawba, Constantia, Isabella, Schuylkill, Muscadel, Woodson and Cunningham, all of which have succeeded admirably, besides nearly forty foreign varieties, most of which have failed, either from the frosts of spring, or the sun or rain in summer burning or rotting the fruit. The experiment was an economical one, as tobacco or some other crop was planted in the intervals, and the ploughing required by that also cultivated the vines. The holes were filled with compost, made of a mixture of stable manure, leached ashes and decayed wood. The vines from the first were thrifty, to the admiration of all who saw them, with scarce a failure—and for three years past have been very productive. Should the next season prove favorable, he hopes to gather enough grapes to make from five hundred to one thousand gallons of wine—besides those for table use. I may hereafter give you some account of an experiment of his in wine making.

He has also about a dozen other varieties of native grapes, some of which he hopes will prove valuable, when cultivated. Your obed't serv't,

N. FRANCIS CABELL.

HINTS TO FARMERS.

From the Albany Argus.

December 19, 1832.—The garden is at once a source of profit, of substantial comfort, and of high intellectual gratification. Its fruits and its vegetables constitute the most grateful delicacies of our tables. Its flowers exhibit the exquisite pencilings of nature, calculated to gratify our senses, and to awaken the finer feelings of our nature. Its employments elevate the mind, reveal to it new sources of delight, and give health and vigor to the body. Its charms are alike calculated to temper the passions of youth, and to solace the infirmities of age. In fine, its pleasures afford one of the best illustrations we can possess, of the happiness of our first parents in their primeval abode. So apt am I to couple in my mind the culture of the garden with whatever is commendable in life, that I never, in travelling from home, see a neatly cultivated spot of this kind, without intuitively imputing to its cultivator the active exercise of the social and relative virtues.

Half an acre of well cultivated garden, will go farther towards subsisting a farmer's family, than perhaps any three acres upon his farm, with the further advantage that while its products serve to gratify a diversity of tastes, they materially contribute to secure the blessings of health. Its labors may be managed by those who are too young or too old to share in the heavier toils of the field by the female inmates of the family and the occasional aid of the workman, without impeding the operations on the farm. My first essays at gardening were made during a period of comparative indigence and of active mechanical employment, which left me little but the usual hours of rest to devote to my garden. My rural labor did not infringe upon my ordinary business; and yet I managed to raise, with a trifling expense, all the garden productions necessary for my family. My zeal for improvement in this new business, attracted the attention of that excellent philanthropist, the late Chancellor Livingston, who encouraged my efforts, by presenting me trees and scions of new fruits, which he had recently brought from France. I budded and grafted, and though my first efforts were bungling, yet I nevertheless succeeded, with the occasional purchase of plants from the nurseries, in establishing in my grounds an excellent assortment of garden and orchard fruit. Thirty years experience has fully satisfied me, that a garden is not only profitable, but that it affords comforts and pleasures which wealth cannot purchase. The passion for rural culture has increased with my years; and I look forward to its employments, should my life be mercifully spared, as the best conservator of health, and the prolific source of future enjoyments.

In many parts of Europe, the garden is not only a common appendage of the farm, but even of the humble cottage; and while these little improvements effect a great economy of labor in furnishing human subsistance, their floral decorations excite peculiar interest and admiration in the traveller, and are the theme of high commendation. In Wirtemburg, Baden, and some other of the German states, this branch of labor has particularly engaged the attention of the governments, and forms a branch of education in the primary schools. A knowledge of gardening is made an indispensable qualification in teachers of schools, who are required to instruct their pupils, in the hours of vacation, in a garden which is attached to every district school.

PEAT MOSSES AND SHELL MARL.

Account of the Peat Mosses and Shell Marl on the estate of Dunnichen, in the county of Forfar. Extracted by permission, from a Manuscript History of Peat Moss, by And. Steele, Esq.

From the (London) Farmers' Magazine.

The changes that have occurred, and the revolutions that have taken place during ages, and are still in their progress, in the filling up of the valies of the earth, cannot perhaps be more beautifully displayed to the philosophic eye, than by examining Resteneth peat-moss, the property of Geo. Dempster, Esq., in the parish of Forfar. Situated 200 feet above the level of the sea, in a hollow from which the water of a copious spring hath had no clear and sufficient issue, this peat bog, consisting of about 70 acres, must have been once a lake. Indeed, that is sufficiently obvious, not only from its connection with a very considerable lake, called Resteneth Loch, almost a mile in length, but especially from a bed of shell marl found beneath the peat, and situated immediately, above the solid ground. The bed of marl (of which substance there is also a great quantity found in Resteneth Loch) is in some places 15 feet in thickness, gently diminished towards the margin of the moss.—Its average thickness is about five feet; but the layer is very irregular. On dissolving a portion of this marl in the muriatic acid, I found it a very pure calcareous matter, containing only about a tenth part of its weight of peaty and other substances. The shells composing the marl many of which are quite entire, are of the water snail or cochlea kind (*Helix putris*, Lin.).

The great value of such a bed of marl ought to be a powerful inducement to every one that possesses any moss grounds to search them carefully, and particularly in their deepest recesses, and even beneath their immediate subsoil, for this important article of manure.

Mr. Dempster hath sold from the bottom of this moss, marl to the extent of upwards of £12,000 sterling, or at the rate of £1000 *per anuam*, ever since the period it was drained, which is about twelve years ago: and the quantity that remains is yet very great.

The immensity of time that I apprehend it would take to form so vast a collection of such minute shell animals is beyond our conception, if we might be permitted to judge from natural causes and effects.

This valley, when it ceased to be a lake, from circumstances now to us incomprehensible, unless the vast accumulation of shells can be deemed a sufficient cause, seems to have acquired a surface fit for the production of trees: for all the under layers of the moss, next to the marl, are composed of roots, stems and branches of alder, birch, hazel (with the nuts of this last tree externally entire,) and some oaks of considerable size.

It hath been supposed possiblethat this collection of trees may have been floated from the high er grounds; but it is not probable that all these trees could be deposited in this manner, as there is no appearance of any rivulet having ever run into the valley. It may rather be persumed that the sediment of water, percolating from the adjacent grounds, may have formed above the marl a soil proper for the growth of trees.

From a wood, the valley must have been transformed into a peat bog or moss, probably by a stagnation of water which would naturally occasion the destruction of the trees and the growth of aquatic plants, which, in such situations, accumulate and never fall into a state of total decomposition. The peat matter is found about six feet thick above the marl, and at the time of the drainage its surface was covered over with heath.

By drainage and the consequent alteration of the nature of the soil, the heath has been entirely obliterated, and the moss, even at the surface, formed into a fine light mould, and covered with grass, coarse indeed in general; but where it hath been gravelled for a road, it is not unworthy of notice, that it is swarded at the sides with the finest pasture grasses and clovers; couch grass or twitch *(triticum repens)* was there also particularly observable.

This moss had been drained by one deep cut through the middle of it, and through a sand bank of the depth of thirty feet which obstructed the issue of the water. The drainage, however, having been intended for the purpose only of obtaining the marl no artificial geneneral improvement of the surface of the ground has yet taken place; but by every appearance, when it shall be done, the crops afforded will be uncommonly luxuriant, from the decomposed nature of the moss, caused by its being so long in a drained state. Mr. Dempster hath enclosed levelled and dug over with the spade about six acres of it, which he means to sow with grass seeds next spring, without any corn crop.

Here are observable some holes which had been dug to the bottom of the moss, containing stagnated water, but now almost filled up again, to the level of the general surface, by bog moss or fog *(phagnum palustre)* not yet solid; a plain example of the quick reproduction of peat matter by the growth of vegetables of the moss or *musci* tribe.

It is also to by remarked, that the peat earth at the bottom of this moss, which appears to have a small mixture of clay, is very solid, and, when cut into peats and dried, makes excellent fuel; and Mr. Dempster observes that firm peats of this sort, and particularly what is found on some of the Highland grounds of Scotland is very little inferior to coal. He burns such peats commonly himself, and has sold many hundred pounds worth to his neighbors from this moss. Their ashes also are valuable for manure, and, by slow and confined combustion, may be produced from the peat in considerable quantity.

The moss of Dunnichen in the parish of the same name, now partly under culture, is situated near four hundred feet above the level of the sea in a small valley kept wet, like that of Resteneth, by a copious spring of water, and also by surface waters descending in rainy seasons from the higher grounds.

It consisted of fifty-nine acres, mostly of peat soil, shallow at the margin, but depening to 15 feet towards the middle. The drainage of it, which was accomplished forty years ago, at the expense of £50, was originally intended merely for the purpose of procuring, more easily, peats for fuel, of which the country stood in great need. Beneath the peat soil was found, on cutting a deep level a layer of sand mixed with a little mud, six feet thick, and immediately under the sand, in some places, beds of marl, mixed, however, considerably with sand.

On the subject of marl as connected with moss, it may not be improper to observe, that though the common practice of searching for marl is by the boring irons used in trying for coal and other hard mineral substances, yet Mr. Dempster very judiciously advises rather to make use of a long wooden pole for this purpose, with an iron augur fixed to its end. This makes the operation of boring for marl both cheap and easy. A pole of twenty-five feet, he thinks, will, in general, be of sufficient length. If the moss be found to be deeper than this, it is easy to join another pole to the first, or to obtain a new one of a greater length.

Shell marl is found in the bottom of the generality of lakes, and of meadows and mosses which have once been lakes, throughout Great Britain and Ireland. It is the remains of myriads of those sorts of small testaceous animals which commonly inhabit pools of water, and have lived and died in those situations.

Some of those shells are univales, (generally *Helix, animal Limax*, Lin.) others are bivalves, (generally *Tellina animal tethys*, Lin.) and are frequently very entire when taken up; but after a short exposure to the atmosphere, they crumble into a fine whitish powder which effervesces with acids, and is, in fact, no way different from powdered limestone. It is commonly more pure from foreign and useless ingredients than most limestones. Some moss marl, examined by Dr. Coventry, Professor of Agriculture at Edinburgh, was found to contain 84 *per cent.* of pure chalk or carbonate of lime, which is more than lime generally possesses, and the refuse of the marl was chiefly peaty substance, which makes the refuse

of such marl of more use as a manure, than that of limestone, which is generally sand or clay.

Shell marl may be converted into quicklime by burning. Its solution changes vegetable colors to green, and it possesses all the other properties of quicklime, and, as such, is used for building in many places of England.

De Pages, in his travels, mentions that the inhabitants of the South Banks of the Mississippi make oyster shells serve all the purposes of limestone. And lands that receive manure from towns where such shell-fish is used, or that have shells in their soil, naturally, or by being brought to them from a shelly seashore, stand in no need of lime for their culture, and are not at all benefitted by it.

Some naturalists, indeed, believe that all limestone, marbles, and other masses of calcareous substances, are derived from the remains of animals, and consolidated either in consequence of fusion by heat, or solution in water; and some of the finest limestones and marbles show, unequivocally, that they are a congeries of shells of the ocean. Beds of these materials are frequently found near the summits of mountains, in which the shells that compose them can be distinctly traced and enumerated by the naturalist.

As a manure, shell marl uncalcined is therefore to be used as lime; but in that state, it is not so minutely divisible, nor so soluble in water, and of course more tardy in its operation; of consequence, however, it remains much longer in the soil than quicklime. On the comparative value of shell marl and lime, Mr. Lummis, in an essay quoted in Maxwell's Husbandry, remarks, 'Notwithstanding that lime is so very good a manure, yet I prefer marl to it; because, lasting five times as long, it is in the end much cheaper, although sometimes it is more chargeable at first than the other.' Likewise, it is obvious that the quantity of calcareous matter in a boll of shell marl is more than double that in a boll of powdered quicklime.—The price ought therefore to be more than double.

ACCELERATED MOVEMENT UPON CANALS.

On Saturday afternoon a trial was made upon the Paddington canal, of the new canal-boat.—The object of the trial was, to show that a boat built in a different form, and constructed of other materials than the ordinary canal-boat, might, by using superior horses, be drawn along the water at the rate of ten miles or more in an hour, instead of two miles an hour, the pace of the boats now in use. The day was remarkably fine. The portion of the canal more particularly appropriated to the experiment was from the third to the seventh mile from Paddington. The boat was constructed of sheet-iron, riveted hot. It was 70 feet long by 5½ feet wide; and painted green and white. The boat was provided with an awning made of white twilled cotton cloth, which had been rendered semi-transparent with oil. The awning was so set up that the top was extended over light wooden arches, which rested upon a thin upright frame of rod iron; and the sides, in the form of curtains, were made to slide at pleasure upon parallel rods placed at the upper and lower ends of the curtains. The rudder was of a single sheet of iron, of about a yard in length, and it was moved by a tiller made of about two yards of stout rod iron. Two steady hunting horses, each mounted by a lad, and the two harnessed to a towing rope of about 150 feet in length, constituted the moving power. The number of persons on board the boat was 48, including the crew, the gentleman making the experiment, some of the principal members of the Grand Junction Company, and the visiters, among whom were Mr. Telford, Mr. Babbage, Captain Basil Hall, Mr. Hellyer, and Mr. Gill; a lady also made one of the party on this interesting occasion. Certain distances were measured on the canal bank, and marks set up at the ends of them. At each of these places also, a man was stationed, with a guaged rod in his hand, which he so held, as that upon the boat's passing, he might instantly read off the height of the wave caused by the disturbance of the water. When all things were ready on the shore, and the party had embarked, the boat was put in motion. The speed from one station to another, taken by second watches, showed, for some time, a progress at the rate of thirteen miles an hour. The horses, however, soon began to tire, and the speed fell to eleven, and ultimately, in returning for the third time, to ten and quarter miles in the hour.

The experiment, as far as it goes, was attended with complete success. The motion is the easiest imaginable. The boat glides along the water so smoothly and noiselessly, that its progress is all but imperceptible to those on board, whose attention is not extended to external objects. A relay of horses will be required at the end of every four or five miles. The banks of the canal will have to be edged for nine or ten inches above the ordinary level of the water with hard materials, and the towing path to be slightly sloped outwards.—Improvements, no doubt, will also be made to facilitate the passing of locks, and in the mode of attaching the horses to the boat, so that the animals may exert their power upon the boat, disembarrassed of the awkwardness of the direction in which, in the present form of towing they are made to put forth their strength.—[*London Albion.*

NEW RAIL-ROAD.

The Compiler recommends the establishment of a rail-road between this city and Potomac Creek. This suggestion presents itself under two points of view:—1st. Is the scheme an *useful* one? 2d. Is this the *time* for us to undertake it?

Its utility seems to be unquestioned. In conversation on Monday last with our accomplished Engineer, Moncure Robinson, Esq., he specified this road among the most useful to the public, and the most profitable to the stockholders, which could be undertaken in Virginia. Among the articles of transportation, he pointed out our coal—which might be conveyed cheaply, and without much handling, and risk of breaking, to Fredericksburg—and by way of the Potomack, to Washington, Alexandria, &c. But he particularly mentioned the carrying of passengers, along the great thoroughfare from South to North, as one the great sources of emolument to the road. The experience of the Petersburg rail-road, so far, shows us, that *passengers* are a greater source of profit than even articles of trasportation—and in this respect, he contends that the Petersburg rail-road will always have the advantage of the Portsmouth road. For example—the following are the receipts of transportation on the Petersburg road from its opening on the 28th October 1832, down to June 1st, 1833:

Months.	*Passengers.*	*Freight.*
November,	$747 48	$456 13
December,	585 74	557 96
January,	1026 61	595 80
February,	1144 79	861 87
March,	1360 89	1321 59
April,	1515 72	1835 92
May,	1609 62	1297 25
	$8190 85	$6926 52

Thus, it appears that for the last seven months, the tolls from passengers are $1,264 more than the freight of produce and goods.

Why should not the contemplated road equally enjoy this great and growing source of profit? The rapidity of the communication (in five or six hours, perhaps, from Fredericksburg to Richmond,) will invite more passengers, speed the mail, and multiply the tolls. That this enterprise, therefore, will hereafter be completed, appears sufficiently obvious. But then the next question occurs Is this the *time* for us to undertake it? Is it not best for *us* to do one thing at a time? *We* are more deeply concerned in the Westen Enterprise. Is it not better for *us* to devote all our energies to this great object first—and not distract our attention or divide our capital?—Complete that enterprise, and every thing else will be easy to us. It is the battle of Arbela.—Win it, and the whole Persian Empire will be at our feet. Accomplish this Westen Work, and where is the enterprise that will be beyond our attainment? The spirit which overcomes this difficulty, will make light every other.—[*Richmond Enq.*

AGRICULTURE OF VIRGINIA.

To the Editor of the Richmond Enquirer.

In inviting your attention, and that of the public to the agriculture of Virginia, I offer no apology other than the assurances of the very deep interest, which I (in common with others,) feel in the subject. Among the great diversity of topics presented to the human mind, none merits more attention, or is more worthy of a thorough investigation, than agriculture. No country is better adapted to its study or practice than ours, and surely there is no occupation, which is more in accordance with our free institutions, or more conducive to our permanent happiness. When we cast our eyes around, and behold the devastation and ruin of large tracts of country, which in "bygone times" were studded with the majestic oak, or carpeted with luxuriant verdure we pause and involuntarily inquire of ourselves what has wrought the change. Is it to be attributed to the superficial fertility of our lands, the impolicy of legislation, or to an injudicious system of husbandry? A discriminating and observing mind will very readily answer, and properly ascribe the bulk of our misfortunes to a too long continuance in a reckless, slovenly' unwise system of farming.

As a general proposition it will scarcely be doubted, that the flourishing condition of any country, depends either upon its manufactures, commerce, or agriculture. Let either of these great departments of industry prosper in any country, and you will see the beneficial effects diffused in a greater or less degree, through all the ramifications of society; but point to a country where neither of these is progressively improving, and you will there behold a corresponding languor pervading all the avocations of life. If it is true, that our state is not prosperous at this time, and that the above premises are correct, it would seem to follow as a consequence, that, if we desire to better its condition, we must direct our attention more assiduously, either to agriculture, commerce, or manufactures. Having arrived at this conclusion, when we look to our mixed population, as well as at the character of our staple productions, we would naturally couclude, that the improvement of the state could be more certainly effected by ameliorating its agricultural condition, than by the adoption of either of the other modes just suggested.

Judging from recent indications given in your city and elsewhere, we have good reasons for believing, that a new era is approaching, and it is to be hoped, that many a resource will be developed which heretofore we thought this state neither had, and probably never was destined to possess. In our career as a community, we have doubtless omitted much, and "left undone those things which we ought to have done," thereby carelessly consigning much to neglect and to ruin, which as good stewards, we should have nurtured, if for no other consideration than purely that of benefitting the commonwealth. It is evident, that we are hourly becoming more sensible of our situation and of the great importance of making more vigorous efforts in the walks of internal improvement and of agriculture.

The time has arrived when our middle-aged citizens should delight more in pointing to other monuments of their fame, than this or that speech or political disquistion, and for every young Virginian to say to himself, I will aid the land of my fathers in surmounting her embarrassments, or we will sink together with her noble pendant nailed to the mast.

It may with propriety be said, that the toast given by a distinguished individual, that "Farmers are the liberal supporters of every interest *but their own*," has remained with us too long uncontradicted. However, I can venture to say, that the laudable efforts of a few individuals in improving the agricultural condition of the state, would enable them conscientiously to repudiate the sentiment.

Having hinted this much,, I will take the liberty of adverting to one fact—that is, the existence of one agricultural paper in Scottsville, Albemarle county, and the assurance of another being shortly edited in Richmond. This indicates a disposition, which I am in hopes will soon becomes general, as I am sure it must be the harbinger of a more flourishing period, and if cherished and sustained by our citizens, must greatly enhance their condition, and make the "wilderness blossom as the rose." To urge reasons why the intelligent should patronise our agricultural papers, or to exhort the other portions of society to imitate the example set by their countrymen to the North, as well as by the inhabitants of Europe, may be esteemed presumption by the one and dictation by the other. But whatever opinions may be entertained on those points, I am sure that nothing would be more gratifying to a few (and perhaps many) individuals, than to see our intelligent citizens light the torch and lead the way. No one need doubt, but that the substantial yeomanry of our land would follow their example, and profit by their sagacity. The press, since its dawn in this hemisphere, has illu-

mined our horizon, and enabled us to make colossal strides, whether in science, in government, or in the arts. It is in fact nearly omnipotent—and there is no good reason to doubt, why it should not be as serviceable when made to stoop to the retired cottage, to amuse and enlighten its humble inmates, as when it ascends to more exalted regions.

In concluding this suggestion relative to agricultural papers, I will only add, that "*knowledge is power*," and that it matters not whether we acquire it by following the husbandman through his fields, or from the columns of a paper.

"What but mind, enlightened and expanded, gives to civilized society the comforts and means of happiness, which is nowhere found in a savage life? And if the mind is beneficial to labor by its skill and contrivance, the more it is instructed in those laws, which nature has established for the government of matter, *and in the experience and improvements of others*, the more likely it is to prove beneficial to our physical powers."

A BUCKINGHAM FARMER.

June 8th, 1833.

ON THE MANAGEMENT OF HAY.

From the (Edinburgh) Farmer's Magazine.

To the Conductors of the Farmer's Magazine.

GENTLEMEN,—If you think the following observations on the management of *hay* deserving of notice, they may be inserted in your next number.

The treatment of *hay* is a subject of high importance to the agricultural interest of Britain, not only as a valuable article of produce, but as constituting a bulky and essential part of the food of our domestic animals, upon which their health and usefulness in a great measure depend.

Where such a valuable interest is at stake, we might naturally expect to see experiments made, and a suitable degree of attention paid, to form a regular system of management. It is much to be regretted, that in many parts of the island, no such attention has been paid; and the treatment, especially in many parts of North Britain, is slovenly in the extreme, and very ill calculated to secure and preserve, in the highest degree of perfection, that flavor, and those nourishing qualities, without which, neither hay, nor indeed any description of herbage, can be valuable.

The first consideration in the treatment of hay, is, the period at which it should be cut, and the weather most proper for that operation. The time most proper for cutting the different kinds of grain, together with every step of the after-management, are points well understood, and for the most part strictly observed; every farmer being sensible, that any neglect of, or deviation from these rules, will, by impairing the quality both of the grain and straw, be productive of much trouble and loss to himself. It is somewhat surprising, that the same kind of reasoning should not have been applied to the management of hay; as any diminution of its value, arising from improper treatment, must be equally prejudicial both to the grower and consumer of that article as to the grower and consumer of grain.

The practice of many farmers in North Britain is, to allow their hay, not only to attain its ultimate growth, but even to make some progress towards decay, before it is cut: to obtain a bulky crop, being their chief object, every other consideration is disregarded; and neither the period of growth at which the cutting ought to commence, the weather most proper for that operation, nor indeed any step of the after-management, are regulated by first rules. In place of cutting the crop during dry weather and when it is free from every other but its own natural moisture, it is very often cut in a wet state, and on that account must remain in the swath a considerable time before it is fit for being put into cocks, during which it requires to be frequently turned and exposed to the sun and atmosphere, for the purpose of drying it: in that way, a considerable proportion of its natural juices are dissipated; and by the time it is dry enough for putting into the stack, it has lost not only its flavor, but a great part of its most valuable properties; an evil that is farther increased, if much rain happen to fall either immediately after the cutting, or at any period before it is put into cocks. In that case, a still greater loss of its nourishing properties, and a consequent diminution of its value, must happen.

The consequences of this management are felt in a variety of shapes, in every district where it prevails. In the lower districts, the mischief is comparatively small, owing to the mildness of the winters, the great quantity of rich forage every where to be met with, and the abundance of corn straw, and other wholesome articles of food, with which these parts abound. In the hilly and upland districts, however, the case is very different; and the loss arising from the neglect and mismanagement of their hay is great, almost beyond calculation. In these elevated regions, the winters are, for the most part, of uncommon length and severity; little straw is produced; sown grasses, turnips, and potatoes, are equally scarce. In that way, the chief dependence of the farmer, for winter food to his stock, falls upon the hay, which, when the quality is bad, and other articles scarce, induces debility and disease to such a degree, that a great part of the stock either die, or are reduced to a state of extreme weakness during the winter; and when the spring arrives, the green food has such an effect upon the bowels of those who have survived, that many of them die also.

The greatest part of the hay grown in these parts, is the produce of the wet swampy grounds, and the plants of which it consists, are of a nature that requires much judgment and attention to cure, in such a manner as to unite every advantage that might be expected from their use. When cut at a certain period of their growth, there is perhaps no species of herbage sweeter, or more tender, or that contains more nourishing juices, or is more palatable to the animals fed with it, than meadow hay. It has already been observed, that, under the present system of management, the period most proper for cutting hay, is less an object of attention than it ought to be. Experience proves, that the greatest perfection of the herbage is met with, either immediately before it comes into flower, or as soon as the first flowers blow. At that period, it is in no shape exhausted, either by blowing a multitude of flowers, or forming seeds, and contains all the useful qualities of which its nature is capable: after that period, it daily diminishes in value, becomes tough, sapless, and unpalatable, and is not chewed without considera-

ble difficulty. This rule applies to every species of herbage that is meant to be dried for winter food; but to coarse hay, the produce of wet or marshy grounds, it is strongly applicable; for, as we have already observed, most of the plants which grow in these situations, when they are in full vigor, are as tender, and contain perhaps as great a proportion of nourishing juices, as any other description of hay; and, when cut at that stage, and properly managed afterwards, form a valuable article of food both for sheep and cattle; but when the cutting is delayed, as indeed it very often is, till an advanced period of the season, when the plants have not only reached their ultimate growth, but begun to decay, this description of herbage become at once the coarsest and least nourishing of all food.

This opinion does not proceed upon theory, but upon the solid ground of experiments carefully made upon many different kinds of herbage, at different periods of their growth, the results of which establishes a fact that cannot be too generally known, viz. that plants of all sorts, if they are cut when in full vigor, and afterwards carefully dried, without any waste of their natural juices, either by bleaching with rain, or exhalation, contain, weight for weight, a quantity of nourishing matter nearly double what they do, when allowed to attain their full growth, and make some progress towards decay.

Hay of all kinds should certainly be cut at the period we have mentioned, and, if possible, during dry weather; and, in place of being suffered to remain in the swath for days, as is commonly done, women with forks or rakes should follow the cutters, and spread it in such a manner as to allow the sun and air free access to the whole. If this operation is properly performed, and the weather favorable, the hay that was cut in the morning will be ready to put into small cocks by midday, where it may remain for two or three days; at the end of which if the weather is dry, they may be thrown down early in the morning, and, after being exposed to the sun and atmosphere for a few hours, put up into ricks of at least forty or fifty stones each, where it may remain with perfect safety, till it is convenient to stack it. By such treatment, every valuable quality is preserved, the hay is of a fine green color, and possesses so agreeable a flavor, that the animals eat it with the greatest relish. Before stacking, some attention will be necessary to render the whole as uniformly dry as possible, especially if much rain has fallen, and the wind continued for any considerable time in one quarter after the hay has been put into ricks; when that is the case, one side will be found damp, while that which is exposed to the wind is perfectly dry; the remedy consists in turning the ricks round, which is done with great ease, by placing six or eight people, at equal distances, round the rick, with directions to thrust their hands as far as they can under the bottom, at the same time grasping a handful of the hay;—when the whole are ready, let them lift at once, and move round in the direction intended, till the damp side is opposed to the wind: in that way, ricks of fifty or sixty stones may be turned with ease and expedition, and the whole rendered uniformly dry in a short time.

It has been contended by many, that there is no great necessity for being so solicitous to have hay thoroughly dry before it is put into the stack, as it will keep perfectly well even with a considerable proportion of moisture; and, should any apprehension be entertained to the contrary, all danger will be prevented, by mixing it with salt; a practice strenuously recommended by many intelligent writers.

Trials carefully made, and upon a scale so extensive as to occasion very considerable loss to those concerned, prove, beyond a doubt, that the addition of salt to damp hay is no preservative against its heating; on the contrary, if moist weather follow immediately after it is put into the stack, the addition of salt, in place of being useful, will prove hurtful; it being a well established fact, that salt and every thing impregnated therewith, greedily attracts the moisture of the atmosphere, and occasions a degree of dampness that would not otherwise have taken place. The experience of persons who build houses with stones taken from the bed of the sea, is an undeniable proof of this; as the walls of such buildings are always damp and uncomfortable: even if they should stand for centuries, have we any reason to suppose that the case will be different when salt is mixed with hay? Either in a damp or dry state, if it is put into the stack damp, the salt will very effectually prevent its farther progress in drying, with this disagreeable addition, that if wet weather follow, the salt, by attracting an additional quantity of moisture, will increase the evil.

The case is not materially different, when salt is mixed with even the driest hay, especially in situations where the climate is moist, and the winters long; for, if the quantity of salt employed is considerable, the continual attraction from the atmosphere during the winter months, if it does not destroy it entirely, will at least have the effect of rendering it musty and unpalatable.

But though we thus disapprove the practice of salting hay when it is put into the stack, whether in a *moist* or dry state, there is every reason to believe, that it will be highly salutary and useful, if applied with judgment at a subsequent period. The beneficial effects of meadows or marshes that have been overflowed with salt water, upon the health of sheep and cattle, and the high relish they have for such pastures, are well known; the preference given by the animals is strong and decided: is there any reason to suppose that an equal preference would not be given to hay tinged with salt?

In bad seasons, when hay has been much injured by the weather, it is not only tasteless, but disagreeable to the animals in the spring, who eat it only from necessity. When that is the case, it becomes an object to mix with it any article that can remedy these defects; for that purpose, nothing is better calculated than salt, which, along with its giving the hay an agreeable taste, has a medicinal effect upon the bowels of the animals; a matter at present too much neglected, while they are feeding upon dry food. The most proper time for applying the salt, seems to be a day or two before the hay is used. At the time, a quantity sufficient for two days consumption should be taken from the stack, and laid either in a shed or barn; a thin stratum should first be spread upon the floor, and lightly sprinkled with water from the rose of a watering-pan; a small quantity of salt should then be equally scattered upon it; after which another

stratum of hay should be added; and the same operations of watering and salting repeated, till the whole quantity is gone through; it should then be well turned and mixed with a fork, and allowed to remain in a heap for one night; after which, it will be fit for use.

It is necessary to observe, that the quantity of water applied should never exceed, what is necessary to damp the hay; and the proportion of salt should be confined to what will give it an agreeable flavor: a superabundance of either, in place of being useful, defeats the purpose for which they are applied. If there is too much water, it runs off, carrying the salt along with it; if too much salt, it renders the hay bitter. The salt made use of should be of the smallest kind, for the purpose of sprinkling it equally; and every possible means should be taken to prevent one part of the hay from getting more than another.

It is worthy of notice, that though the salting of hay a day or two before it is used, is in general attended with advantages, we beg leave to be understood as meaning only the coarsest kinds, or such as may have been injured by the weather; for, in every instance where it has been cut at the proper season, and well managed afterwards, the taste and flavor will be such as to recommend it to the animals, without any addition whatever; but in unfavorable years, when the quality is much impaired by the weather, especially if the hay is coarse, and treated in the manner commonly practised in the hilly and upland parts of the country, the operation of watering, with the addition of salt, will, by softening and giving it an agreeable taste induce the animals to eat it with advantage, in many instances when it would otherwise be rejected. It is perhaps in such cases only, that salt can be useful, unless it be meant as a medicine; and it is very apparent, that the hint of using salt at all, originated in the preference given to salt marshes over other pastures, by both sheep and cattle.

In treating of an article of such value and importance as hay, it is worth while to inquire, what are the most advantageous and economical modes of using it.

Every good farmer is now sensible, that when any considerable quantity either of hay or other fodder is given to horses, sheep, or cattle, at once, the effect of their breath blowing upon it, joined to other causes, renders it so disagreeable, that they soon loath and refuse to eat it; in that way a considerable part of it is lost. On the contrary, when it is given frequently, and in small quantity, it contracts no disagreeable smell, and the animals eat up the whole. Farmers of a certain description will no doubt object to this mode of feeding, on account of the trouble with which it is attended. With them, it is a maxim, that if the animals are fed once, or at most twice, in the twenty-four hours, it is sufficient; and that if they are hungry, they run no risk of starving, while they have food so near them. They do not, however, reflect upon the injury which the fodder thus used sustains by being breathed and trod upon, and impregnated with dung and urine. Let such men consider, for a moment, how they would relish the remains of their dinner served up for supper, after being kept within a yard of their nose during the interval, upon the same plates, with the same knives and forks, without any washing or cleaning. There are few people, indeed, who would not nauseate and reject such a meal.

The case cannot be very different with any of our domestic animals, when they have a quantity of hay or other fodder given them, sufficient for a whole day's consumption: having it constantly in their sight, and being blown and trod upon, impregnated with urine and otherwise injured, it becomes loathsome beyond description; and, in place of being eat up, which it always is when small quantities are given at a time, and frequently repeated, a great part is rejected. It ought therefore to be a rule with all farmers, to give little at a time, and repeat it frequently, always taking care that what was last given shall be consumed, before they receive an additional supply. By such management, no part of the fodder will be lost, and the animals will at the same time derive more benefit from the use of it.

Another economical practice remains to be mentioned, namely, the mixing of straw with hay. From many trials in different parts of the country, it appears, that where good straw can be had in plenty, it may be mixed with hay to great advantage. Some farmers are in the habit of mixing straw with cutting grass, the benefit of which will be afterwards noticed. When straw is mixed with hay, the process of curing may be accelerated, and the quality of the hay at the same time improved, by leading out the straw to the field, mixing it intimately with the hay immediately after it is cut, and putting the whole into small hand-cocks, as soon as it is mixed. It is well known, that when moist and dry bodies are brought into contact, the former begin to give out a part of their moisture, which is as greedily absorbed by the latter, and continues to be so till a balance is established between them: or in other words till both contain an equal proportion of humidity. This is precisely what happens when dry straw is mixed with green herbage. Immediately after they are laid together, the straw begins to absorb a part of the juices, and continues to do so as long as the grass will part with any. In that way every part of the natural juices is effectually preserved; and the straw, from the absorption of what would otherwise have been either evaporated by the sun, or washed away by the rain, is rendered nearly equal in value to the hay. Where this practice is followed, and due pains taken in the mixing, very little exposure to the sun or atmosphere is necessary, and the hay will be fit for putting into the stack in half the time that is required where no straw is used.

In place of leading out the straw to the field, it is customary, in some parts of the country, to mix it with the hay in the stack, by laying alternate stratums of each, a practice that answers pretty well, but is much inferior to that above recommended. It may, however, be very useful in unfavorable seasons, and be the means of preserving hay that could not be cured otherwise.

When straw is mixed with grass for present use, a quantity sufficient for several days consumption should be cut at once, and after mixing, laid up in pretty large heaps, and allowed to remain in that state for a couple of days at least; at the end of which, the straw will be found much softened and impregnated with the juices of the grass. When a fair trial is given to this practice, several advantages will be found to arise from it. The

first is, the conversion of a considerable quantity of straw, which would otherwise have been of little value, into a wholesome and nourishing article of food; the *second*, that grass so mixed, has not that purgative quality it is known to possess in its simple state, and seems to keep the bowels in a medium state, preventing alike the extremes of scouring and costiveness, circumstances of much importance to the health and strength of the animals.

It has been recommended, and to a certain extent practised by some farmers, to mix old and new hay. Upon this point, we have simply to observe, that if old hay has been well got, and properly secured in the stack, it will be found for many purposes superior to the new; it certainly contains a firmer and more concentrated nourishment than new hay can possibly do: and for all animals that are employed in constant and severe exertion, it is infinitely preferable. There is a period, however, beyond which, even the best old hay will, by being excessively dried, begin to be impaired in its quality, and be eaten with much less relish. In such cases, a mixture of new hay will be useful; as the old, by the absorption of the new juices, will recover a part of the moisture and flavor it had lost by long keeping. The same thing will happen, if the hay of the former years has been of an inferior quality, owing either to its having been allowed to stand too long before cutting, or to its being bleached with rain after it is cut. In either of these cases, the defect will be in some degree repaired, by mixing it with new juicy well flavored herbage. A. Z.

ON THE FLOATING OF LAND.

From the (Edinburgh) Farmers' Magazine.

To the Conductors.

GENTLEMEN—Amongst the many pertinent and sensible remarks in your review of Mr. Middleton's Survey of Middlesex, I was surprised to find that the reviewer should think Mr. Middleton speaks in rather too high terms on the subject of irrigation, when he states, "that forty acres of good water meadow will support, in the greatest luxuriance, 500 Wiltshire ewes and lambs for six weeks, from the middle of March to the first of May." On this quotation from Mr. Middleton, the reviewer observes, "that it exceeds any thing he has met with respecting the produce of grass land; for it is only the best meadow that will feed five ewes and lambs per acre, from the middle of March to the first of May; and the greatest part of the pastures in the kingdom will not support near so many."

As the produce of watered meadows certainly very far exceeds the produce of the best pasture land, or the best *unwatered meadow* in the kingdom; and as the floating or watering of land is one of the greatest improvements that can be introduced into any country, when the rearing or feeding of stock is an object; I would beg leave to point out to the attention of the reviewer, the following statements of the produce of watered meadows by different authors.

Mr. Davies, in his agricultural survey of Wiltshire, on the subject of watered meadows, states, "that *one* acre of good meadow will support 500 Wiltshire ewes and lambs for one day; consequently forty acres will support the above stock for forty days, which is only two days less than in the statement given by Mr. Middleton.

Mr. Wright, in the second edition of his treatise on watered meadows, gives the following instance of the produce of a meadow in the neighborhood of Cirencester. "It was one which had been watered longer than the oldest person in the parish could remember, but was by no means the best meadow upon the stream, nor was the preceding winter favorable for watering. It contains six acres and a half. The spring food was let for seven guineas, and well supported near 206 sheep, from the first of March till the beginning of May; the hay was sold at thirty-two guineas, and the aftermath for six guineas. A meadow of seven acres, the whole crop of hay on which had been sold for £2 before it was watered, has, ever since it has been laid out as a watered meadow, been let at the annual rent of £3 per acre."

In Mr. Wright's third edition, is the following account of the product of a meadow:

"In order to make the most of the spring food, the proprietor kept the grass untouched till the 2d day of April; from which time he let it to the neighboring farmers, to be eaten off in five weeks by the undermentioned stock, at the following rates per head: A sheep, 10*d.* per week; a cow, 3*s.* 6*d.*; a colt, 4*s.* The quantity of land is eight acres.

107 wedder sheep, one week,	£4	9	2	
8 cows, ditto,	1	8	0	
4 colts, ditto,	0	16	0	
	£6	13	2	
				5 weeks.
Total of 5 weeks,	33	5	10	
3 colts, 3 weeks, to be added,	1	16	0	
	£35	1	10	

Or £4 7*s.* 8 $\frac{9}{12}$*d.* per acre.

After being fed as above, the hay crop was, as usual, about fifteen tons, and was six weeks in growing."

Since such are the immense advantages to be derived from the floating of land, and that, wherever there is a considerable stream of water, many acres may be thus highly improved, I think extracts from the treatises of Mr. Wright, on the art of floating land, and from Mr. Davies's account of the art, in his survey of Wiltshire, might be introduced with great propriety into your valuable magazine. Yours, &c. S. E.

ANNUAL CHARGE ATTENDING A PLOUGH AND TWO HORSES.

From the (Edinburgh) Farmers' Magazine.

To the Conductors.

GENTLEMEN—Experimental agriculture being an object of importance, I am glad to notice that you propose to pay it considerable attention. Having some reasons to believe that the expense attending experiments is seldom justly ascertained, I beg leave to send you a statement of the annual charge of a plough and two horses, which may serve a double purpose. It will show the immense increase which has taken place in the price of labor and assist those who may transmit you the result of experiments, how to calculate the expense,

Annual Charge attending a Plough and Two Horses.

Servants' wages and maintenance	£21	0	0
Corn for two horses, from the 1st of October to the middle of June. 3 firlots per week, which ,with odd feeds, may be taken at 30 bolls,at 19*s.* per boll - - -	24	0	0
200 stones of hay, to be eaten when the horses are taken from green food, and betwixt yokings during seed-time, at 7*d.* - - -	5	16	8
1½ acre of clover and tares for summer food - - - -	9	0	0
Smith and wright work - -	5	0	0
Saddlery work - - -	1	0	0
Interest on capital stock at 5 per cent.* - - - -	6	0	10
12½ per cent. on £70 perishable stock, for tear and wear -	8	15	0
Annual charge	£80	12	6

Now let us endeavor to ascertain from the above, what is the charge per acre to the farmer for ploughing and harrowing his land.

It will readily be granted, that 42 Scots acres per plough is as great a quantity as can be properly managed in ordinary cases. If this extent is arranged agreeable to the common six-course shift, there will be 7 acres in summer fallow, 7 in wheat, 7 in beans, 7 in barley, 7 in clover, and 7 in oats; and the number of ploughings and harrowings during the course will be,

1. Fallow,	6 ploughings,	3 harrowings.
2. Wheat,		2 ditto.
3. Beans,	2 ditto.	3 ditto.
4. Barley,	2 ditto.	4 ditto.
5. Clover,		
6. Oats,	1 ditto.	3 ditto.
	11	15

Multiplying the above numbers by 35, the quantity of acres actually under tillage, and dividing the amount by 5, the number of breaks, the result will be, that two horses, during the year, plough 77 acres once over, and give 105 double times of harrowing to one acre of ground. As their expense for that time is £80 12*s.* 6*d.* it may be classed as under:

77 acres once ploughed, at 18*s.* 3*d.*	£70	4	3
105 harrowings, at 2*s.* - -	10	10	0
	£80	14	3

It will no doubt be attended to, that all the other operations performed by the man and the two horses, when not engaged in ploughing and harrowing, are included in these charges; but as they are paid from the produce of the above quantity of land, and as these incidental operations are, in fact, work required upon the premises, it is deemed unnecessary to state them separately, as this would not lessen the sum-total of the labor-account. It therefore appears, that 35 acres of land, in a productive state, and under a six-course shift, are labored by the farmer at the expense of £80 12*s.* 6*d.* or £2 6*s.* per acre, independent of seed corn, grass seeds, harvest work, thrashing, marketing, incidental expenses, and the support of the family.

In debiting a particular field for farm labor, I know of no better method, than first to ascertain the ordinary outlays, then to reckon up the number of ploughings and harrowings given to each field, and, after finding how much that amounts to per acre, to proportion the expense accordingly. If these rules are adhered to, the expense and profit of the farmer's operations may be as minutely ascertained as the concerns of the merchant and manufacturer.

I need scarcely add, that every article in the annual expense of a plough and two horses, is very moderately charged, being at least one third below what they will amount to this year. For instance the servants wages and maintenance will be £30 and the value of corn given to the horses, in all probability three fifths more than the sum charged.

I am, sir, yours, &c. A RURAL ECONOMIST.*

*The capital stock, so far as respects ploughing may be reckoned as follows:

2 horses - - - - - - -	*l.*42	0	0
Plough, brake, and harrows - -	5	5	0
Long and close carts, with wheels and iron axle - - - -	15	0	0
Barrows, grapes, forks, &c. - -	0	15	0
Saddlery - - - -	7	0	0
Servant's wages - - -	21	0	0
Horse corn - - - -	24	0	0
Hay - - - - -	5	16	8
	*l.*120	16	8

ON MANAGEMENT OF FARM DUNG.

From the (Edinburgh) Farmers Magazine.

SIR—As the indispensable necessity of repeated applications of *dung*—that is to say, putrescent animal, and vegetable matters, for recruiting and preserving the fertility of the earth, is universally admitted, every means by which the quantity of this important substance may be enlarged, or its efficacy increased, must be a valuable acquisition. You have, therefore, done the public good service, in communicating the thoughts of so diligent and successful an inquirer into the secrets of nature, as the illustrious Sir Humphrey

* The Scottish measures above named, as well as others of frequent use in English agricultural works, will require explanation.

Scottish Grain Measures.

4 lippies, or forpats = 1 peck,
4 pecks = 1 firlot,
4 firlots = 1 boll.

The firlot contains 2197⅓ cubic inches, 47 more than the bushel of England which is used in Virginia. The barley firlot of Scotland (according to the Gentleman Farmer) contains half as much more as the common firlot, or as 3 to 2. Probably this particular measure is no longer used, and that the firlot may be always counted as a bushel.

The acre of England and America contains 43,360 square feet.

The acre of Scotland contains 55,353 6-10 square feet—so that 4 of the latter are little less than 5 of the former—or the comparative extent is as 44 to 35 very nearly.

4 bushels (English) = 1 coomb. 2 coombs = 1 quarter.

A *stone* is 14 lbs. avoirdupois weight.

The pound sterling and its parts are used above.—[*Ed. Far. Reg.*

Davy, on the subject. By a careful consideration of such scientific principles, and applying them according to circumstances, the attentive husbandman may adjust his own practice—enlarge the quantity, and improve the quality of his farm dung—and thus add to the fertility of the country. If you think the following remarks can tend any thing to that purpose, if you please you may publish them in your next number.

Sir Humphrey begins with vegetable substances, and shows that green succulent plants contain the largest proportion of easily soluble matter.—He recommends, therefore, that they be ploughed into the ground while they are still fresh and green about the time of their flowering. But it must be remembered, that the generality of green plants can be used to greater advantage than that of ploughing them immediately into the ground as manure. Besides, if the plants are to be raised on the ground which they are destined to manure, that ground must either be possessed of a tolerable share of fertility, or the plants must be of a puny growth, and the quantity of manure thus obtained inconsiderable. Hence it is evident, that a great part of the substance of which those plants are composed must be derived from the soil; and ploughing in the plants is not a great deal more than restoring to it that of which it had been recently robbed.

Dry straw, that is, the stems of plants, dried and hardened in the air is justly represented as widely differing from tender green plants, being possessed of little easily soluble matter, and much woody fibre. To overcome the reeistance to solution, which this substance has acquired, it is commonly submitted to some kind of fermentation; and Sir Humphrey expresses his doubt of the propriety of indiscriminatingly adopting this practice, recommending rather to cut straw small and keep it dry till it be ploughed into the ground.—So long as farmers must keep live stock, and not only supply them with a variety of food, but, for the sake of health and cleanliness, accommodate them with a comfortable bed of litter, it is not probable that there will much straw remain, even of that worst quality, to be used in the manner here recommended. But it may not be improper to take under consideration a prescription so directly opposite to ordinary practice.

Sir Humprey does not here give explicit reasons for prescribing the application of unfermented straw as manure, reserving these till he comes to treat of composite manure. He only says, that 'though it would produce less effect at first, yet its influence would be much more lasting;' which no doubt would be the case. But the farmer expects a prompt return. The soil, indeed, is continually consuming all dead animal and vegetable substances committed to it: and, gradually reducing them to total dissolution, absorbs the dissolved matter, and yields it again for the nourishment of growing plants. But when such substances are dry, they imbibe moisture partially, and the decomposition is languid and slow. If, however, a quantity of straw, steeped for some days in water, till it become soft and pliant, be put in the ground, two or three inches under the surface, any plant, growing over, or contiguous to it, will in a short time assume a deep verdure and vigorous growth, and grow for some years with remarkable luxuriance, after the conformation of the straw is annihilated, and no traces of it left. Hence it would appear that straw, soaked and supplied in water, would be preferable te dry straw; for though, by the force of fermentation, the component principles of vegetables are disengaged; and such as are capable of taking a gaseous form, are dissipated in air, and lost to the husbandman, before they are committed to the ground; yet they would ferment more freely in the ground, by being first well soaked in water; and Sir Humphrey approves of a slight incipient fermentation, for which the presence of water is requisite. As straw alone, however, is seldom used as manure any, farther consideration of the process of fermentation, and its effects, may be waved till we come to composite manure, which chiefly occupies the attention of the farmer. For the same reason, the judicious remarks of this celebrated author, on manures from animal substances, may be passed.

The dung of horses, cattle, sheep, &c. is itself a composite, consisting of animal matter, mixed with the undigested fibres of their food; and we are informed, that it yields nearly the same products as vegetable substances. This substance is always less or more moist when voided; and if continued so, soon decomposes and disappears in the soil with which it is mixed; but if suddely dried, will keep in perfect preservation for a very long time, and almost lose its peculiar fetor; it will even long preserve the same appearance, when afterwards buried in the moist earth. The dung of live stock is still more compounded by the straw and offals which have served for their litter; and this mixture forms the dunghill, on which the farmer depends for renovating the fertility of the soil. The management of this substance, in such a manner as to render it most efficient, is therefore of great importance; and on this, we are favored with the opinion of this illustrious philosopher. 'A slight 'incipient fermentation,' says he, 'is undoubtedly 'of use in the dunghill;' (and indeed it is una-'voidable) 'for by means of it, a disposition is 'brought on, in the woody fibre, to decay and dis-'solve, when ploughed into the soil.' And again: 'Too great a degree of fermentation is very pre-'judicial to the composite manure of the dung-'hill; it is better that there should be no fermen-'tation at all before the manure is used, than that 'it should be carried too far.' To form a candid judgment of this opinion, it seems proper to take a view of the putrefactive fermentation, in those varieties which circumstances produce.

The three great agents of fermentation—water, a warm temperature, and air, have each their peculiar effect; as their presence is less or more abundant. If fermentable substances are immersed in water, the process goes on very slowly; the parts of the subject are rather separating, than the component principles disengaging; and this is accelerated by heat. When the subject is exposed to the free access of the air, a hot fermentation quickly commences which is most rapid in a warm temperature, and when there is just moisture enough to keep it alive. Thus circumstanced, farm dung quickly consumes; more than half perhaps of its bulk escapes in vapor and gas; and what remains, by being rendered less soluble, must yield less support to vegetation. Our senses may convince us, that such is the case, if we will take the pains to make use of them, and should overcome the prejudice so generally prevalent, for wasting both

the bulk and value of farm dung by fermentation, before it is ploughed into the ground. It is in vain to attempt to check the rapidity of fermentation in dung, thus exposed to the influence of that process, by watering, as Sir Humprey justly observes; for when it is laid up open to the air on all sides, no more water will adhere to it, than serves to hasten its consumption.

Some degree of fermentation will indeed be ever operating in this highly putrescible substance, before it can be carried to the field; but it is more economical to control, than to accelerate it. The component principles might then be preserved almost entire, and turned into the ground in that state. As fermentation proceeded, a genial heat would be raised in the soil; the volatile principles escaping, would go directly to the support of vegetation; and the more refractory parts would be gradually dissolving, and both yielding food to plants, and mending the construction of the soil. To allay the fermentation, Sir Humphrey prescribes covering dung with compact earth, so as to seal it up from the access of the air, having first dried it as much as possible. In this, he is perhaps not quite correct. Turning it over to be dried, would provoke fermentation; and it would be impossible to make it so dry as to be incapable of fermenting. Besides, as the fermentation is most violent when water is present in a low proportion the consumption would be rapid, and the residue of little value. But the dunghill, which is daily augmenting, cannot be sealed up. His prescription for its site is more commendable. He directs that it be shaded as much as possible from the rays of the sun, and that it be an excavation, paved in the bottom, from which no water can spontaneously escape. If all the dung litter, and every kind of refuse putrescible matter, about a farm, be successively collected into such a place, blended together, and regularly spread with a level surface over the whole space, the mass can then be duly compressed, to exclude the too free admission of air. Over this, any urine of the live stock, which the litter has not absorded, chamber-ley, and every kind of foul water, should from time to time be sprinkled; and when these are not sufficient, plain water should be added, to keep the surface always quite moist. When farm dung is managed in this manner, all its parts being brought nearly in contact by compression, and the small interstices filled with liquid, the fermentation is restrained, and the manure is suffering very little loss, either in bulk or fertilizing quality:—at the same time, it is undergoing a very important preparation. The fibres, soaked in putrid water, though not consumed, are much weakened; the cohesion of the parts is relaxed; the elasticity destroyed; and the mass is fitted to dissolve in the soil, and yield abundant nourishment to growing vegetables, the volatile and most soluble parts not having been previously dissipated by a powerful fermentation. If a quantity of farm-dung be taken out of a wet dungstead, and laid loosely up to the air, it will be cool at first; but heat will soon be generated; it will smoke violently, and emit very pungent effluvia; which may convince any one, that the value of the manure has been preserved by being kept in that situation.

From a dungstead of this description, where all the different matters are blended together, closely compressed, and equally soaked with putrid water, different sorts, to suit different soils or purposes, cannot be taken; but one sort suitable for all soils and crops, will be more valuable than all the possible sorts or varieties. It is believed, that farm-dung, managed as above, may be successfully applied to every kind of soil. Soils, indeed, which are dry and friable, and easily disposed to fall into fine mould, sooner operate the decomposition of unfermented dung, than those which are cohesive, and more retentive of water; but such dung, by fermenting in the soil, has a powerful effect in mellowing soils of the latter description. Nor does it appear that such manure can be less proper for turnips. After the parts are become flaccid by compression and long steeping in putrid water, this manure, lying compact, and holding as much water as it can absorb and retain, one would think that turnips would be exposed to as little hazard over it as over highly fermented dung, and find much more nourishment. But if the turnip husbandman shall persist in dissipating one half of his manure, in order to get the use of the other, there seems to be no reason why others should follow such a wasteful example.

These crude remarks, which other business has prevented me from putting in a better form, contain the judgement which I and a number of my neighbors have formed relating to the management of farm dung, founded on a pretty long tract of experience; and we think it our duty, upon your invitation, to submit them to the public. Here it may be added, that we find farm dung, treated as above well adapted for compounding with peat-moss, according to Lord Meadowbank's rule, of which we approve, and such of us as have access to that substance, practice. If you please, you may give this a place in your valuable publication.

I am, sir, your humble servant,

A. D.

Clydesdale, 20th Oct. 1813.

AGRICULTURE OF THE NETHERLANDS.

By the Abbe Mann. Extracted from the 5th Vol. of Hunter's Georgical Essays.

From the (Edinburgh) Farmers' Magazine.

The characteristic features of the Belgic peasants are, *industry*, great *economy*, and a strong *attachment* to the methods and customs of their predecessors.

Few people are more attached to their customs and practices than the Belgic peasants. They seldom change their methods of agriculture, being persuaded that their forefathers were as wise and knowing as themselves, and that what they did, is the best themselves can do. Whatever may be judged of their manner of living, and of the form of their dwellings (in which, however, they are as contented and happy as the most elegant English farmer,) it will easily be acknowledged by those thoroughly acquainted with the Flemish agriculture, that their practices are far from being either bad or irrational: on the contrary, it seems that long experience has so well succedeed in adapting these to the nature of the soil, that it would be hard to do any thing better. During the many years I was at the head of an establishment which had many farms in property, and desirous to have them cultivated to the best advantage, I tried what experiments I could to this purpose. The intelligent farmers whomrI often consulted on these

heads gave me satisfactory reasons, why the methods they followed were preferable to what I proposed doing; and also why this would not succeed, as it proved in effect. The general result which I have been able to form, from what I know of the Flemish agriculture, is, that they draw from their farms, the best crops, and the most food for great and small cattle, fowl, &c. which the soil is capable of producing. The quantity thereof is certainly great, when compared to any extent of land in Germany, France, Spain, England or any other country I am acquainted with. The comparison, if made with due knowledge and impartiality, will certainly turn in favor of Flemish agriculture, whatever may be said in preference of the neatness and elegance of the methods used elsewhere, and of the usefulness of the new-invented machines employed therein.

What I have already said, is as much as this essay will admit of, on the general nature of Belgic agriculture. I shall now add a few words on the principles which the legislature follows with respect to it.

These are chiefly confined to the following heads: 1st, Permission for exportation of corn in times of abundance, and restrictions in times of scarcity: 2dly, Ordinances for bringing corn to be sold at the markets, and for preventing it to be bought on the field, or at the farmer's: 3dly, Ordinances, in some provinces, for restraining the extent of farms, and prescribing a division of those of too great extent; also forbidding the destruction of farm houses without rebuilding them.

The ordinances for bringing corn to be sold at market, are generally eluded: the corn is bought at the farmer's; he brings it to market, exposes it, and his first answer is, that it is sold. This is often the cause of murmurs among the people; but I know of no remedy found for it, except the prohibition of all exportation, which takes place as soon as a real scarcity is felt; and this in its turn excites the murmurs of the farmers, who have seldom any other view except their private interest, and who, always having corn enough for their own use, never see a scarcity in the country.

As to the methods of agriculture, or the nature of crops, the government of the Low Countries takes no cognizance of them, but leaves every one to do what he thinks best; and certainly private interest and the love of gain are the best stimulants on his head, and seldom fail to excite each one to cultivate his ground in the manner, and with the productions, which he finds most profitable. Experience thereon in his only rule and guide.

The most universal land-measure in the Low Countries is the *bunder* or bonier. In Brabant and Hainault it contains 400 square perches or roods of 20 feet long; so that the square rood contains 400 square feet, and the bunder 160,000.—The rood varies in different parts, as does also the foot, which in general is less than the English one. On an average the bunder may be reckoned three English acres. In Flanders, land is usually measured by what is called a *ghemet*, a measure containing three hundred square roods; the rood being in some places twelve, in others fifteen, Flemish feet long: but, in some parts of this province, a bunder or bonier is in use, containing 400 square roods, as in Brabant and Hainault: but the rood varies in different cantons, from ten to twenty feet in length. The bonier contains four journals of land.

In the rest of this essay, I shall treat briefly of the methods of agriculture in different parts of Flanders, Brabant, and Hainault, distinguishing them according to the different nature of the soil, and confining myself to such practices as are generally established in each. As the difference of climate is insensible within these limits, I shall prefer the order which results from the soil, to that of locality, as the practices of husbandry, in an extent of flat country not exceeding one hundred miles any way, are determined in a great measure by the soil alone.

The different soils I shall speak of are the following.

1. The sandy heath of the Campine of Brabant.
2. The parts of Brabant contiguous to the Campine.
3. The strong clayey soil of Walloon-Brabant, and the northern parts of Hainault.
4. The soil of the middle region of Brabant, being a mixture of sand and loam.
5. The light sandy soil about Bruges.
6. The rich loam of the districts of Ghent, Courtray, and Maritime Flanders.
7. The artificial soil of the Pays de Waes.

The Campine of Brabant.

It is well known that the Campine of Brabant, which is the northern port of that province, consisted originally of sand covered with heath, interspersed with lakes and extensive marshes, and here and there with woods of fir. Tradition supposes it to have been once a part of the sea. To this day where cultivation has not extended, the soil of itself produces nothing but heath and fir.—The sand is of the most barren and harsh kind, nor can it be rendered fertile, but by continued manuring. As the property of this ground may be acquired for a trifle, many have been the attempts of private persons to bring tracts of it into cultivation; every means have been tried for that purpose, and government has given every possible encouragement to it. But I have not heard of any one, however considerable might be his forturne, that has succeeded in it, and many have been ruined by the project. What is cultivated in the Campine, is owing to the religious houses established in it, especially to the two great abbeys of Tongerloo and Everbode. Their uninterrupted duration for five or six hundred years past, and their indefatigable industry, have conquered these barren harsh sands, and rendered many parts of them highly productive. The method they follow is simple and uniform; they never undertake to cultivate more of this barren soil at a time than they have sufficient manure for; seldom more than five or six bunders in a year; and when it is brought by labor and manuring into a state capable of producing sufficient for a family to live on, it is let out to farmers on easy terms, after having built them comfortable habitations. By these means, many extensive tracts of the Campine are well cultivated, and covered with villages, well built houses and churches. The abbey of Tongerloo alone furnishes about seventy of its members as curates to these parishes, all of whom owe their existence to that original stock. I may add here, and that from the undoubted testimony of the historians of the Low Countries, that the cultivation

of the greatest part of these rich provinces, took its rise from the self same means, eight hundred or a thousand years back, when they were in a manner one continued forest.

A Campine farm of twenty bunders is stocked with two or three horses, seven or eight cows, some oxen, and is cultivated with coleseed, clover, rye, oats, and little or no wheat. It is hardly necessary to add, that potatoes, turnips, and carrots are cultivated not only in the campine, but throughout all the Low Countries. But the culture of spergule *(alfine spergula major)* is more peculiar to the north of Brabant, though not confined to that tract alone. It serves the cows for autumn food, and the butter of this season is called spergule butter, of which the campine furnishes a great quantity especially to Brussels, where it is employed for the use of the kitchen, as being both cheaper and more profitable than any other for that purpose. This plant is sown where corn has been reaped, after the ground has been lightly ploughed. Cows are tethered on it in October, and a space allowed to each one proportionable to the quantity of food which is proper for her. This pasture lasts till the frosts come on.

As spergule gives but little straw, and consequently little manure, the farmers supply the want thereof in the following manner:—The peat or sods which are cut from the heath, are placed in the stables and cow-stalls as litter for the cattle. The ground under them is dug to a certain depth, so as to admit a considerable qnantity of these peat sods and fresh ones are added as the feet of the cattle tread them down into less compass. These compose so many beds of manure, thoroughly impregnated with the urine and dung of the cattle. This litter is renewed at proper times, and that which is removed from the stables and cow-stalls is laid up in heaps, till it be carried into the fields where it is to be spread. This mixture produces a compost of excellent quality for fertilizing ground where corn is to be sown. By these means a far greater quantity of manure is produced from the peat, than could be had by burning it, as is done in some parts. In the Campine of Brabant, the main object which the farmers have in view, is to obtain a great quantity of manure, without which all attempts to cultivate that barren soil are in vain.

Besides butter, the Campine furnishes the rest of Brabant, and Brussels particularly, with great quantities of fat fowl: the markets are constantly supplied with them, and they are preferred to any other of the same kind. They are not less sought for and esteemed in South Holland.

The parts of Brabant contiguous to the Campine.

There are no great farms in these parts, and hardly any such thing as tenants; each farmer is a proprietor; and as he cultivates his own ground, it is clear that he will do all he can to render it fertile, without impoverishing it: far different in this respect from the tenant, who only seeks his own temporary interest, by forcing the soil during his lease, if he has no assurance of renewing it, indifferent how much he may impoverish the land for the future.

There are many meadows in these districts, which give regularly two crops of hay, one at midsummer, the other towards the end of August.—It is not observed that frequent mowing impoverishes those meadows whose soil is deep and fat. If others of inferior soil appear spent, the custom is to sow them for three succeeding years with oats, and the last thereof mixing clover with the oats: by this means they become excellent meadows anew.

In proportion as the ground rises from the meadows, it diminishes in goodness, becoming at last a rough brown sand, mixed with pebbles; and under this is a stratum of compact clay, through which water filtrates with difficulty. Such ground as this gives small crops of rye, but it is excellent for black or Turkey wheat *(bled Sarrazin.)**

The productions of this part of the country are, wheat, rye, barley, oats, and Turkey wheat; and as food for cattle, spergule, clover, turnips and potatoes. They cultivate also, rape, coleseed and flax, chiefly for their oils; and also tobacco. I shall add a few observations on some of these.

The good corn land of this canton never lies fallow; the only rest that is given it, is to let it lie a year in the clover that was sown on it with the corn the preceding year; and then it returns again to corn, which is produced in its former abundance. It has been observed likewise, that the best crops are produced when the corn is sown thin.

Turkey wheat made into paste, and fried with fat bacon, is the ordinary food of the peasants of these parts, and also of the Campine. It serves them likewise for fatting their fowl; of which, as we said above of the Campine, they feed great quantities for the markets of the rest of Brabant and of Holland.

Great quantities of spergule are likewise cultivated in this district. It is sown immediately after the corn is reaped. This plant is excellent in the latter season for cows: it is wholesome, and increases the quantity and the goodness of their milk; and the butter made from it is fatter, and keeps better, than that made from grass in May and June.—Spergule serves likewise for manure, in light soils, on account of its succulent and fat nature: being ploughed down while it is still green, it serves as a partial amendment for sowing wheat on the ground.

Clover is sown along with rye, barley oats, wheat, and even with flax. Clover seed is a great branch of commerce in this country. When they do not choose to let the clover grow up for seed, it is cut at least three times in a year. After the last cut, the plant is ploughed under, and makes a good manure; and, when a little dung is added to it, wheat or rye are profitably sown on the ground.

Turnips and carrots are sown indifferently with any sort of corn; insomuch that in autumn, after the corn is reaped, the fields appear covered with them; and it is observed, that those which grow in this manner, are better than those planted in gardens, and are an excellent and healthy food for both men and cattle.

Potatoes are here likewise of great use for both. Their culture serves to amend ground newly broken up, by dividing and lightening its too compact parts, and rendering it thereby proper for sowing rye on, the following year.

Coleseed *(colza)* and rape require a strong soil, and rather dry. Flax exhausts the ground, and is detrimental to the culture of corn on it. Tobacco produces a still worse effect of the same kind.

* Buckwheat.

It has been found of great use in this part of the country, to divide the land into small fields, enclosed with ditches and quickset hedges, which shelter the vegetation from the dry winds and frosts of the spring; nor are they less useful in long droughts, for the same reason. The ditches are receptacles for the water which runs off in rainy seasons, and contribute also to the growth of the hedges, which are cut off for faggots every five or six years. Oak, beech, birch, poplar, hazel, &c. are planted for these hedges, the growth of which is kept down by frequent cutting.

Walloon Brabant, and northern parts of Hainault.

The soil I shall speak of under this head, is in general a cold compact clay, almost impenetrable to rain, and in droughts hard and full of cracks.—In ploughing, the furrows are made from eight to twelve feet in distance. Lime and marl are found to be the best manures for this ground, which is manured one year in three. Long experience has shown, that the earth, after ploughing, must not be too much broken; for if it be, the rain forms it into an even compact mass, which afterwards dries and hardens, so as to become like one of the barn floors of the country; whereas, when the earth is left in clods, these crumble away insensibly during winter and spring, and thereby cover gradually the roots and young stalks of the corn.

Culture of Wheat.—The ground whereon wheat is to be sown, is completely dunged, and ploughed five times; the first time in November, the second in March, or April, the third at Midsummer, at which time the dung is spread on it, the fourth in August, the fifth and last in September. Four raziers, weighing 100 lib. each, are usually sown on a bunder, which gives in its turn fifty raziers, when the crop is good. When lime is used for manure, four wagon loads are usually laid on a bunder.

Rye.—This is sown on land that has been dunged and sown with wheat the foregoing year. Two ploughings suffice. The sowing is begun about the 20th of September, if the weather permits: and in the spring, clover is sown on it. The crop is usually ripe in July.

Meteil.—Wheat and rye sown together are called meteil. This mixture is sown, like rye, on a ground that has borne wheat the preceding year, and which has been ploughed in the same manner. The sowing and reaping time of meteil are a little later than those of the rye.

Oats.—They are sown preferably on land which has borne clover; and in this case one ploughing suffices.

Clover.—Clover is sown along with wheat and rye; 20 lib. of seed are used for a bunder. An artificial meadow of clover, remains good for two years; but in the spring of the second year, forty tubs, (cuvelles) of ashes, each weighing about 60 lib. are spread on a bunder: but this quantity varies according to the season and the nature of the ground.

Potatoes and Carrots—Are great articles of cultivation in these parts, and used for both men and cattle; but the methods have nothing peculiar.

Turnips—Are sown on a well dunged ground about the middle of July; and before the end of September, if the season be favorable, they are fit to be given to the cattle, who feed partly on them as long as they remain good.

Horse-beans, Peas, Vetches.—All these are cultivated in these parts of the Low Countries, without any material difference in the manner from what is practised elsewhere.

Colzat or Coleseed.—It is sown about the middle of July, and the young plants are transplanted about the end of September. This is done with a narrow spade, sunk into the ground, and moved with the hand forwards and backwards, which simple motion makes a sufficient opening to receive the plants: a boy or girl follows the laborer with plants, and putting one of them into each hole, treads against it to close it up. If the plantation is done with the plough, the plants are placed at regular distances in the furrow, and are covered with the earth turned up by the succeeding furrow. Sometimes after the coleseed is planted, the foot of the stalks are covered by means of a common spade, or hoe, with the earth near it, which furnishes nourishment for the plants during winter, by the crumbling of these little clods of earth over the roots. The coleseed is reaped about Midsummer, or later, according as the season is more or less advanced; it is left on the field for ten or twelve days after it is cut, and then thrashed on a kind of sail-cloth, spread on the ground for that purpose, and the seed carried in sacks to the farm. When the crop is good, a bunder produces about forty raziers, of 80 lib. weight each. It is to be observed, that the ground whereon coleseed is to be planted, must be dunged, and twice ploughed, the same year it is put in use.

Flax.—The land for sowing flax, must be carefully cleaned from bad weeds, and well dunged. Some farmers for the sake of getting better crops of flax, sow it on clover ground, which they dung towards the end of September, and plough afterwards. One hundred and eighty pounds of seed are sown on a bunder, as soon as spring comes on. When the flax is about four inches high it is carefully weeded, without which precaution the weeds would stifle the plants; and this is repeated as often as the weeds get head anew. When the crop is good, a bunder yields about 400 lib. weight of flax. The flax of this part of the country is much inferior in quality to that produced about Courtray and Menin.

In these parts of the Low Countries, the farms are usually much greater than in Flanders, and in the middle region of Brabant, where the land is richer. In Hainault, all farms of above seventy bunders have been divided; but this has not extended to Walloon Brabant, where there are still many great farms.

A farm of seventy bunders* is usually distributed as follows: ten bunders of meadow, ten of wheat, twelve of rye, three of winter-barley, one of spring-barley, eight of oats, four of horse-beans, peas, and vetches, and eight of clover; which together makes fifty-six bunders in cultivation, the other fourteen lying fallow, in all seventy bunders. For cultivating such a farm, eight horses are necessary; and it is stocked with sixteen cows twelve oxen, and a flock of two hundred sheep; besides hogs and fowls in proportion.

The Middle Region of Brabant.

The land here is a mixture of sand and loam,

* About 210 English acres.

which makes an excellent light soil, but not so rich as that of Flanders, though preferable perhaps for corn. The usual productions of this part of the country are wheat, rye, oats, barley, beans, peas, vetches, clover, turnips, carrots, and potatoes. No ground here lies fallow; the farms are seldom extensive; forty bunders may be taken for an average. The distribution of a farm of this size is usually into about six bunders of meadow, and thirty-four of arable land.

These last are manured almost yearly, with from twelve to sixteen wagon loads of manure to each bunder, those in clover excepted. On these it is usual to spread, in March, turf-ashes brought in boats from Holland. From eighty to one hundred tubs of about sixty pounds weight each are employed for a bunder, one third of which is kept to be spread after the first cut. Many of the Flemish farmers make great use of these ashes, which being highly impregnated with salts, enrich the land so as to render it capable of producing excellent crops of wheat, without any other manure except turning under the clover it was sown with the preceding year.

In most farm-yards, a deep ditch is dug near the cow-house, into which the urine of the cattle runs, and a sufficient quantity is gathered, for spreading over two or three bunders, which proves an excellent manure.

The arable part of such a farm as I am speaking of, is distributed as follows: five bunders of wheat, five of rye, two of meteil, two of barley, four of oats, two of beans, peas, and vetches, five of clover, four of turnips, carrots, and potatoes, and five of coleseed; in all thirty-four bunders, the other six being meadow.

The following rotation is used in the culture of these parts. The ground being well manured, the first year coleseed is planted; the second year it is sown with wheat; and the third with rye, without dunging. From two to three raziers of wheat of 80 lib. each, are usually sown on a bunder; and when the crop is good, it yields from thirty to forty raziers of the same weight.

Some farmers spread turf-ashes on the ground where they have sown turnips and carrots, as well as on that sown with clover, &c. and then pass the harrow over it.

In a favorable year, a journal (a quarter of a bunder) of land well manured, will produce from fifty to sixty sacks of potatoes.

Those that feed sheep in the districts where no land lies fallow, feed them, as well as their other cattle, with corn, beans, peas, vetches, turnips, and other roots.

Agriculture of Flanders; and first in the environs of Bruges.

The quality of the soil varies greatly in different parts of the district of Bruges, although the main constituent of it be every where a light sand. In many parts, continual manuring and cultivation have rendered it extremely rich; in some spots, for want of these, it is less so; but a more extensive population would soon bring them into the same state as the rest.

There are many large farms in this part of the country, belonging in general to the rich abbeys; those of lay proprietors are for the most part less; and those of which the farmers themselves are proprietors, are still smaller. The culture in these cantons is regulated as follows:

A ghemet, or measure of land, is manured the first year with dung, or, near Bruges, with a boat load of street dirt from that city; it is then sown with flax; the second year wheat is sown on it; the third year rye; the fourth year it is again slightly manured, and sown with oats or Turkey wheat, and sometimes with clover, turnips, carrots, parsnips, or potatoes.

Clover is sown along with oats, and only lasts a year; it is afterwards ploughed, manured, and sown with wheat and flax.

Broom is sometimes sown as an amendment for bad land, and pulled up at the end of the second year, during winter. The ground is then dunged, ploughed, and cultivated with later crops, sown in the spring.

Turnips, carrots, parsnips, and potatoes, supply in these parts the want of meadows, and great care is taken to preserve them during winter for food for their cattle. Turnips, carrots, and parsnips are laid in the earth, in round heaps, of eight or ten feet in diameter at the bottom, and five or six feet high; when the first layer is placed, it is covered with long straw; and so on alternately to the top. These heaps are opened in the winter or spring, according as the farmer has need of them for feeding his horses and cows; they are given likewise to early lambs, when young grass is wanting.

Potatoes are kept in deep holes dug in sandy ground, where they are seldom hurt by ordinary frosts, and keep good till far on in the spring.

In this tract of country, there are many little woods of oak, elm, beech, alder, and here and there fir of the maritime kind. Great quantities of willows are planted, and some are let grow up into trees, out of which are made windlasses for the boats and barges of the country: these sell dearer than oak.

Lands on the Rivers Lys and Scheldt from Menin and Courtray to Ghent and Dendermonde, and also of Maritime Flanders.

The soil on the flat banks of the Lys and the Scheldt is reckoned among the best in Flanders; it is in general, a rich, sandy, moist loam, become almost black with a long and uninterrupted cultivation. Hardly any great farms are found here; those of from sixty to eighty ghemets are counted the greatest, and they are generally less, as the land is richer.

In the largest of these farms, there are seldom more than three or four horses, and ten or twelve cows. The farmer employs from twenty to thirty wagon loads of dung for three ghemets of land, and only fifteen or sixteen loads, if it be street dirt from the great towns, or turf ashes brought by water from Holland.

These lands produce grain of every sort in great abundance, as also every kind of esculent roots, which are given to the cattle in winter, along with their hay. The meadows along the rivers, and in others parts of this rich and moist soil, are superiorly good, and the clover is the most luxuriant I ever saw. It is usual to spread, in the spring, sixty sacks of turf ashes on three ghemets of clover sown the preceding year, which proves an excellent manure to it.

A great branch of culture in these parts, and

particularly in the districts of Courtray and Menin, is that of flax, of which they produce an immense quantity, and of the finest kind. The expense of this culture is great, the labor bestowed on it in weeding, is almost uninterrupted, and the damage it does to the soil in exhausting its vegetable juices, is beyond measure; but in return, a good crop will almost buy the ground. To recover the soil after a crop of flax, clover and spergule are sown on it, and turned down for manure.

The plough used for this fine light soil, has a little wheel and an immoveable sower! one horse serves to draw it, or two at most in the strongest of this ground.

Lands uncultivated, and fields lying fallow, are here unknown. There are few woods in this part of the country; but all the fields are enclosed with hedges, and thick set with trees, insomuch that the whole face of the country, seen from any little height, seems one continued wood.

The agriculture in Maritime Flanders is much the same with that now spoken of, as the soils of each bear a great resemblance; only that near the sea is more moist, the meadows are more extensive, and little or no flax or spergule are there cultivated. If there be any material difference between these soils, it consists in the greater quantity of marine substances, which enter into the composition of the soil of Maritime Flanders than of that in the inner part of the country, and these add to it an additional degree of fertility.

The castlery of Furns, and the environs of Dixmude, abound more in excellent meadows than any other part of the low countries: the number of horned cattle fed there is immense, as is also the quantity of butter produced and sold, chiefly at Dixmude market; and it is of the best quality both of richness and keeping.

The Pays de Waes.

The land of Waes is the district lying on the north side of the Scheldt, between Ghent and Antwerp; it is a perfect flat, and it is reckoned the richest part of Flanders. The original soil was pure sand, and its present state of fertility is owing to the great number of its industrious inhabitants, who cultivate a few acres round their dwellings, of which, for the most part, they are proprietors. The natural meadows are rich, and the great number of cows which the inhabitants keep, furnish manure in great abundance. But they are not content with this alone; great quantities of turf-ashes are brought thither from Holland, as also a great part of the street-dirt and dung from Brussels, Antwerp, and Ghent, besides what is had from the many rich and populous towns and villages, with which this district is covered.

The farms being so very small, few horses are kept in the land of Waes; the ground is chiefly worked with the spade and hoe, which the extreme lightness of the soil renders easy. If a plough be used, it is of the most simple kind, without wheels, and drawn by one horse. All these contribute together to give a richness and fertility to the soil of this tract which surpasses almost what can be imagined. No spot lies uncultivated.

The common method of culture is as follows: a bunder of land is manured, once in seven years, with from forty to fifty cart loads of dung, and town dirt. The first year it is sown with hemp; the second with flax; the third with wheat; the fourth and fifth with rye; the sixth with oats; and the seventh with clover, Turkey wheat, turnips, or carrots. Fallow ground is unknown here.

Spergule is sometimes sown about mid August, on land that has borne wheat; and in October the cows are put into it. The spergule which they cultivate for seed is sown in March, and reaped in June.

It is to be observed that the riches of the land of Waes consist chiefly in the culture of flax and hemp; the other crops being in general for their own use, and for home consumption, which indeed is very considerable, on account of the great population of this district. The produce of their flax and hemp is so considerable, that in a good year they are reckoned to amount almost to the value of the ground.

The agriculture of the land of Waes, passes, indisputably, for the most complete and perfect in all the Netherlands.

For the Farmers' Register.

LEAVES FROM A TRAVELLER'S NOTE BOOK.

A Walk through Shirley Farm, Nov. 28th, 1832.

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One of the early steps taken by Mr. Carter, for the improvement of Shirley, was the reverse of our general practice of extended cultivation.—From about seven hundred acres, the previous extent of the arable land, he reduced the whole space of high-land subject to tillage to four hundred acres, divided into four fields, besides some twenty acres in lots which are mostly kept in grass. The remaining body of three hundred acres, the poorest of the farm, formed a standing pasture, until lately, when it was again brought under cultivation, and subjected to the general rotation of crops.—The purchase and substitution of two hundred acres of poor land for standing pasture, made this change practicable and expedient. A tide swamp of eighty five acres was also added to the extent for cultivation eight years ago, when it was first diked and drained. This has been under corn every year since, and by its abundant product of grain, and of forage and litter for manure, permits corn to be excluded altogether from the general rotation, which is as follows:

1st year—Wheat on clover lay—not mowed previously, and but partially grazed.

2d.—Oats

3d.—Wheat on oat stubble ploughed in, and clover seed sowed.

4th Clover—to be turned in for wheat in autumn, as before.

The ploughing of the clover land is begun in the first moist state of the soil in August, and continued usually until October, before it is completed. The ploughing is as deep as can be done by three good horses to each plough. All the manure is given just before the latest of this deep ploughing, and usually serves for fifty acres, including the summer running cow-pens. This is the only deep ploughing given to prepare for the crop; but shallow ploughing and repeated harrowings are given as required before and after sowing the wheat.

I should suppose that but few soils could resist exhaustion under this severe rotation, even with all the aid here derived from manure and general good management: though Mr. Carter's observation and experience have led him to form a very different opinion. He thinks that even on inferior soils, with proper attention to vegetable manures,

three grain crops may be made in each rotation of four years, and yet the land be kept improving in product.

The general soil of Shirley is a dark brown clay loam, deep, and originally very rich, and possesses in a high degree the valuable qualities of the low level tracts on the tide water of James river, which seem to have been originally formed by alluvion. The higher part of farm is of a different and inferior soil. Mr. C. received the estate greatly impoverished by the usual management of overseers during his minority—and since, has restored it to nearly or quite its former fertility. The soils naturally the poorest, he supposes are now more productive than at first. Fortunately for the success of his labors, the surface was too level to be much hurt by being washed, (the most effectual means for destroying land,) and yet it is sufficiently undulating to be kept perfectly drained—and great care is used for this purpose. The fields are kept in beds of fifteen feet—and that lately sowed in wheat has every water furrow well and neatly opened and cleaned out by the ploughs, and small shallow ditches (or *grips*,) cut across the beds in every depression of the surface, so as to draw all surface water from the furrows, and discharge it from the field. These grips are opened by ploughs and spades after sowing and covering the wheat, and are so small as not to obstruct the future tillage. The most productive crop of wheat yet made by Mr. C. (though not the largest) was some years ago, before his present rotation was completely in operation. From 110 acres of wheat on clover lay, and 80 more succeeding oats and corn, he reaped and measured 5322 bushels or between 27 and 28 of average product to the acre. Of this, the part succeeding clover was of course much the best, and some acres of it probably brought 40 bushels. The wheat after clover in the present rotation is usually double as much as the same land will bring two years after, when succeeding oats. Besides the objection to this rotation of being too exhausting for most lands, I should have supposed that it would keep the soil full of weeds—as there is no cleansing or horse-hoed crop introduced. But this evil does not seem to exist here: for though Mr. C. complains loudly of his annoyance from blue-grass, and partridge peas, the appearance of his fields when seen under grain, and the amount of crops reaped and sold, sufficiently prove that these pests must be kept from doing much injury. The deep and effectual ploughing, rapid succession of crops, followed by a heavy smothering crop of clover, must be the means which serve to keep down the growth of weeds.*

Gypsum acts here well on clover, and has been used extensively—but is not continued to be applied to every crop of clover. It is used however whenever the young growth is endangered by a dry season. Stone lime (from Maine,) to the amount of 500 casks was used a few years ago, (in such a mode of application as to be mostly carbonated, or made mild, before acting)—and with great benefit to the first crop, wheat, which I saw when nearly ripe: of course the benefit will be permanent. The lime was bought at a price unusually low, (less than $1 the cask,) and the effects so well paid the cost, that like applications would have been made every year since, but for the higher price of stone lime. The scarcity of fuel forbids of burning of oyster shells for manure, as is done so beneficially on some of the estates lower down the river. Mr. C. proposes now, as cheaper than lime in any way, to give calcareous manure to his fields, by bringing marl across the river from the beds in Prince George county.

The deep ploughing of the clover lay, and the sod not being turned back by a second ploughing, prevents most of the clover seed from coming up: and to avoid any risk of loss by relying on the volunteer growth for a crop, a full allowance of seed is sowed at the proper time in every course of crops. The thicker the clover plants may stand, the more seed will be made to the acre: this was to me a new fact—and is directly opposed to opinions that have been published.

The partridge pea is one of the worst pests on such soils as that of Shirley, and I have found it to increase so much on sandy land after marling, that it seemed that wheat culture would ultimately be rendered altogether unprofitable. These worst evils were experienced after early sowing. Any soil over which this plant has once been spread, is so filled with its hard and almost indestructible seeds that the most careful tillage will never remove them. Every deep ploughing brings to the surface a new supply of dormant seeds, which will sprout as soon as the first cold weather in October begins, *and not before.* To keep this growth in check, Mr. C. harrows his clover lay after the deep ploughing, and does not sow the wheat until the weather has been cold enough to sprout most of the plants near the surface. This may be expected to take place from the 10th to the 20th, on land ploughed not less than fifteen days before,—Then, a very shallow ploughing, or repeated harrowings, serve to cover the seed wheat, and at the same time to destroy every plant of partridge peas in their then tender state—and not enough plants will again rise to materially hurt the crop of wheat. Thus the partridge pea makes still later sowing necessary than the Hessian fly. My own practice of ploughing (on corn land) deep and well, and then sowing or harrowing in the seed wheat with as little delay as possible, is no safeguard whatever against this weed—as every seed brought up by the plough, is left to spring up with the wheat. At Curles' Neck, I was shown a piece of excellent land under wheat sowed early last month and on which partridge pea had sprung in abundance, although in the course of the rotation three previous successive growths of that plant had been brought up by the plough, sprouted, and then destroyed by tillage. The individual plants of partridge pea are as easily killed by the plough and harrow, as any plant whatever—but the succession of plants is endless.

Mr. C. has usually kept 20 horses, about 100 head of horned cattle, and a sufficient stock of hogs for home consumption. He has also 200 sheep, but not here, they being kept on a poor farm a few miles distant, the cultivation of which has been abondoned. With the stock above named, and the vegetable materials for litter furnished by the crops of grain and hay only; there are annually manured about fifty acres. Very little

* Since these notes were written, I have learned from Mr. C. that I was mistaken in this respect. The increase of blue grass is so great, and its growth is so destructive to the clover crop, and impedes so much the preparation of the land for wheat, that some horse-hoed crop, or cleansing tillage, must be adopted.

hay is made, because not needed for food since the marsh was reclaimed. No leaves are used, because there are none sufficiently accessible and abundant. No roots or succulent crops (to any extent) are used for feeding either lean cattle or beeves; it being supposed that an acre of land in corn will produce more aliment, than the same land and labor can bring in ruta baga, or mangel wurtzel, &c.

The winter cow-yard is now being prepared with enclosure and sheds to receive the cattle. They have not yet been moved from the summer pens, but will be as soon as the yard is littered. It is made evey year in the field on which the manure is to be applied the succeeding autumn. Dry sheds, made of long rived slabs, stretch along the whole north side of the yard, and partly along the adjoining east and west sides. The straw and other food is placed in different parts of the yard, in racks formed of fence-rails crossed over a low horizontal pole: and these racks when full, form additional shelters for the cattle from wind and driving rains. The cattle never leave the pen except to be watered, and that not more than twice a day—and in the coldest weather, only once, which is thought sufficient, if done about 1 o'clock. The stock have never appeared to suffer injury from this long confinement. In the spring, when the necessity for feeding has ceased, and the cattle are moved to the naked summer pens, the manure as it lies in the winter yard is usually about two feet thick, and is left in that compact state until September, being sheltered from the sun by a thick coat of straw.—It is carried out and spread just ahead of the ploughs that are turning in the the clover lay for wheat. The harrowing that immediately follows the ploughs closes the seams, and less loss is sustained, (as Mr. C. thinks,) or more profit gained from the manure, than could be by other more usual modes of management. The manure is sufficiently, though not completely rotted, without the trouble of moving and heaping it to ferment in the spring; and the fermentation must be slow and gentle, from the compressed state of the mass.

The unusual extent annually manured by Mr. C. and the unquestionable general and great increase of fertility which he has thus produced, are alone sufficient to command much respect for his opinions as to the proper application of manure.—Still, others are as certain that there is great loss in not using the manure for a spring crop to precede wheat, as well as from its being left exposed with so broad a surface in the pen through the summer, and in the earth after ploughing under, in September. Its being buried beneath a good furrow-slice, while the temperature of the earth is so high, without excluding air or moisture, must serve (in my opinion,) to excite a new fermentation, and cause a great loss of products, as there would be no growing plants to absorb them.

Reclaimed Marshes. The diked tide swamp of Shirley is so beautiful a piece of the most fertile land, and is kept in such perfect good order, that whenever I have seen it, my first feeling of admiration has almost compelled me for a time to yield all my objections to such improvements; and in enjoying the view of the beauty and fertility thus created by enterprize and industry, to forget my convictions of its transient value, and certain future end. This piece, of eighty-five acres, was covered by the thick growth of ash and gum, which is common on fresh water marshes of an elevation above ordinary tides. It has now been diked and drained seven years. If I may judge the soil by examinations of my own lands of like appearance, and of the embanked salt marsh of Hog Island, this contains fifty per cent. of its weight (when perfectly dried for examination,) of vegetable matter, destructible by fire, and consequently by putrefaction, when exposed to the air, and the alternations of wet and dry weather. But this vegetable part of the soil (composed of rotten roots, &c.) which is found at all known depths, is so porous and spongy, and so light when dried, that for it to form one half of the weight, it must constitute nine tenths of the bulk of the soil. My knowing these facts of the composition of our marsh soils was enough to convince me that whenever drained and cultivated, they would as certainly *rot* away, as would a large dung-hill if left standing for a number of years. The careful and excellent management of the Shirley swamp, will cause it to present the strongest confirmation of my opinion. Most of the embanked marshes on James River have, from neglect, been returned under the dominion of the tides so soon, that the cause I have mentioned was not permitted to be seen operating alone. In every such case, the final failure of the embankment has been attributed to some extraordinary high tide, or to the cutting through the bank by muskrats, or to the water penetrating under and "blowing up" the flood-gates or trunks. Here, there has been no neglect. Disasters have occurred indeed, of such magnitude and frequency, that there are not many persons who would not have abandoned the improvement in despair. But, whatever damage has been sustained, was speedily repaired—and the land has every successive year yielded a crop of corn, the best of which was more than fifty bushels the acre, and the whole making a general average of thirty-five bushels of sound corn for every year, and through every disaster and loss. The level of the land within the dike appeared to my eye, (and confirmed by Mr. Carter's opinion,) to be already eighteen inches lower than that without, which was still subject to the tides. The bank was originally six feet high. Every winter since it was built, a foot of additional earth has been laid on the bank, which was not enough to counterbalance the loss of the ensuing summer: for after all these additions (which are exclusive of the repairs of extensive breaches made by high tides,) the banks is now lower than at first. But what is most important in the matter, the clear profit from the crops has already greatly overpaid the whole expense of making and preserving the embankment; and therefore the usual loss attending such improvements will be avoided—unless the proprietor should too long endeavor to defend his work from its inevitable end, the water resuming possession of the whole space. Though I am no advocate for the embankment of our tide marshes (compared with other improvements,) yet if such works are undertaken, it is of the utmost importance that they should be well executed: and all who are unable to resist the most besetting temptation of tide-water proprietors, will do well to practise the same liberal expense of labor, the care and watchfulness, and the perseverance through difficulties and disasters, that have concurred to secure the success and profit of the embankment and cultivation of the Shirley swamp.

James City Soils, and Resources for their Improvement.

* * * * * *

December 7th, 1832. The highest land lying between York river on one side, and James river and Chickahominy on the other, is generally a poor sandy soil of very worthless qualities, except for abounding with beds of fossil shells, (or marl as it is miscalled,) of the richest kind. The manure is now generally used, and though in such a manner as not to yield half its value, still it has done much for this part of the country, and presents a remarkable contrast with all other parts of the usual farming practice. Contrary to what is found higher up the country, the beds of marl here are plenty only under the highest (or ridge) land, where it is exposed in most of the ravines—and they appear but in very few places near either of the neighboring borders of the three rivers. Almost every person who has marl, uses it to some extent—and it is accessible to almost all. The uncommon richness of most of the marl that I saw, makes its use as cheap at a mile from the pit, as at less than half that distance under common circumstances. Judging from my limited observations, the beds of marl contain less of calcareous earth as we proceed from the sea coast to the falls of the rivers; though there are many and frequent exceptions to this general rule. Fortunately for those who here led the way in this improvement, their early progress was so slow, that they had full opportunity to observe the damage produced by marling too heavily, before any man had more than a few acres so injured; and as accident had also shown that manure from the farm-yard, &c. was an effectual remedy, they were enabled soon to correct the evil. Thin dressings of marl, and using their putrescent manure always after marl, have prevented any late or considerable loss from using the latter manure. The usual rotation here among the best farmers, is the old "three field" course—or 1. corn—2. wheat or oats—3. close grazing on the natural grass and weeds that succeed such tillage. The marl commonly raises the product of corn to double, or more than double the previous crop—say from one, or one and a half barrels, to three barrels the acre. But no subsequent or greater increase is usually obtained, (which the severe tillage sufficiently accounts for,) and the soil remains of inferior quality, notwithstanding its great advance towards fertility. Whatever putrescent manures are applied, are found to be much more permanent than before marling, with aids in sustaining the soil under so exhausting a rotation. Some do not even allow as much rest to the land as the three shift course requires. The only farm seen that had no dividing fences, and therefore could not be grazed, was under a grain crop every year, viz: 1. corn—2. wheat, or oats, according to the power of the soil. Wheat under such general management, and on so sandy a soil, is necessarily a poor crop: but Mr. Archer Hankins usually obtains ten bushels from one of seed, and (as he supposes,) not much less than that quantity from the acre. Most of the facts here stated respecting this neighborhood were learned from Mr. Hankins, who first commenced marling in this part of the country, and indeed was the first, I believe, who succeeded in all Virginia. How long ago was his first experiment he does not know; but certainly before 1816. Yet the public remained ignorant of this improvement, and it is only within the last twelve years that the use of marl has slowly extended. My own practice began in 1818—and at that time, and for two years after, I had not heard of this improvement in James City or elsewhere. This is one of the many proofs of how much valuable information is lost, and how much the improvement of agriculture is retarded, by the want of means for communication among farmers. Even after this mode of improvement was commenced by perhaps twenty isolated individuals, each remained ignorant of the success or errors of his fellows, and had to grope alone and unaided through all the difficulties and losses that every experimenter must undergo.

The price of land here is very low—from $1.50 to $5 the acre; the highest price being for farms already marled in part, or having good buildings. A large body of land, nearer to Williamsburg, very poor, but having marl-beds, sold a few years ago at only seventy-five cents. The land generally, without marling, I should consider worthless; but with the great means for improvement which are offered by nature, it seems to me that a purchaser might obtain here more agricultural profit, than from any land within my previous observation. The land that has been brought by marl to three barrels of corn, would by mild culture and not grazing, rise to five barrels per acre.—Clover has scarcely been tried. Mr. H. long ago sowed in clover a part of his marled land, which produced well; but the succeeding corn crop was so bad, that he abandoned clover on that account.—The land had been broken late, (say in February as is usual here,) and by single horse ploughs Not one man in his neighborhood uses a two horse plough. The introduction and judicious use of clover as an auxiliary means for improvement, would add as much additional value and profit to these lands, as the owners have already derived from marl alone.

This marl region takes in parts of both York and James City countie sabove Williamsburg.—The surface is generally waving, and often hilly but I have never seen poor and broken land so little subject to be washed and gullied by heavy rains. I infer that the very sandy and open texture of both soil and subsoil serves to soak up the rain as fast as it falls, so that the water seldom flows over the surface.

Near this part of York river the land becomes more stiff, and more hilly. No marl known, or considered accessible. Heard of it only on one place on Chickahominy, (near Edloe's ferry,) in James City, and no where on that side of James river, from Chickahominy to some miles below Jamestown island, where (at Martin's Hundred) it is again found, and in great abundance. This stretch along James river in which no marl is seen is generally level land, and not high. On York river from below Queen's creek to York town three is much and rich marl, but not all the way. Wherever it is found below the mouth of Chickahominy, with very few exceptions, the marl is as rich and as abundant as could be desired. The bank from which most of Mr. Hankins' land had been marled appeared to vary between 60 and 80 per cent. of carbonate of lime, and was opened more than fifteen feet perpendicular without reaching the bottom.

* * * * * *

The highlands around Williamsburg, are also of acid and light soil, and generally poor, and broken by ravines. The land however is no where so light as that above. Marl of the best quality, and in abundance, is found about Williamsburg and has been generally used for some years with good effect, and in some cases over extensive surfaces. Still, land near the town shows the same general and strange depression of price—notwithstanding valuable and profitable improvements having been made by some farmers, and similar means being at the command of all.

* * * * * *

Manure from Castor Beans. Dr. T. G. Peachy of Williamsburg carries on the manufacture of oil from the castor bean (*palma christi*) which is raised for sale on many farms hereabout, and is cultivated still more extensively lower down the country. The "bean-pomace," or the solid parts of the beans, remaining after the expression of the oil by a powerful hydraulic press, has been found to be one of the richest of manures. Dr. P. applies only fifty bushels to the acre, which he thinks insures to him twenty bushels of wheat (in good seasons) from the poorest land of his farm, which, without the manure, would not bring more than five bushels. Its effects however are soon at an end, and are not expected to last longer than on a single crop. But clover sowed on the wheat so manured is found to "stick well," which ought to show those who use this manure how to prolong its short lived effects. Dr. P. applies to his land all the bean pomace yielded by his press, and would not sell it at twenty-five cents the bushel, as he considers its use worth more. It could formerly be bought at the oil-works at Hampton and Norfolk at five cents the bushel, then at ten cents, and now not at any price, all being engaged by contract. Mr. D. Galt, (who though a new comer to Williamsburg and a novice in farming, has already made great improvements and profits on his newly purchased land, by marl and other manures,) brings from Norfolk to this place all the bean pomace which a manufactory of castor oil there yields. It is a pity that those who can obtain this very rich manure do not always use it on marled land, and sow clover afterwards. Even of those who use marl largely and value it highly there are few who will attend to its quality of fixing putrescent manures—and by that neglect, fail to profit by its most important benefit.

The use of bean manure must necessarily be confined to a small space, on account of the limited supply. But I am induced to believe, that the experience of the introducers of this manure, will prove valuable to the very extensive district in which cotton is cultivated and the seeds used as manure. If cotton seeds were mashed, instead of being fermented for manure as is usual, they probably would be found richer than the pressed beans. The oil alone must be the sole enriching property of both—and the beans, after being pressed with such an enormous force, cannot retain as much oil as the cotton seed have, before losing any, I have heard the value of cotton seed estimated as high as twenty-five cents for manure, and wonderful products are stated to have been obtained by using them "in the hill" for corn. But without denying such effects, it is certain that they are not general—and there seems to be as much due to luck as judgment, when this manure is very productive. If the seeds are used without being fermented, they sprout, and I suppose that their oil is hereby changed to something else more fit for food for the young cotton plants, and is lost as manure for the soil. The plants so produced are *weeds* to the crop intended to be manured, and as troublesome to destroy, as they are useless if left to remain.—To avoid this, the seed are usually exposed in heaps to the weather, and pass through a violent fermentation, which destroys the power of germination, and leaves the mass a rich manure certainly—but much less so than the oil alone would have been without fermentation. I am ignorant as to what are the chemical changes thus produced—but doubtless they are considerable, and destructive of much value in a mass so rich in oil, and so putrescent. When at Mr. Hankins' farm, I saw preparations to grind cotton seed in a common apple mill, to be used for manure.

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A GLEANER.

Believing that such information will be both interesting and valuable to others who design similar improvements, we have asked, and expect soon to receive from Mr. Carter an account in detail of the embankment and draining of his marsh, the cost of the original work, and the difficulties of its preservation, together with a statement of the crops and porbable profits secured. We also hope to obtain from Dr. Peachy the information he can furnish respecting the novel practice of manuring with the refuse parts of castor beans. Both these communications will be presented to our readers as soon as possible after their arrival—which we hope will be early enough for them to be included in this number of the Farmers' Register.—[*Editor.*

MARKET FOR COCOONS.

The public will no doubt be gratified with the information that a silk filature is to be established in Baltimore, and that a market for cocoons will thus be secured. Mr. Hitchcock, the proprietor of the American Farmer, is authorized to purchase cocoons for the filature, and to pay from twenty-five to fifty cents a pound for them, according to quality. This is the full value of cocoons, and editors in the interior will no doubt do the *country* and the *cause* essential service by giving circulation to this paragraph through the medium of their papers. This may also be considered an answer to numerous inquiries where a market for cocoons can be found, and the price they will command.—[*American Farmer.*

SUN-FLOWER OIL.

This article is beginning to attract attention in the west. Messrs, Prouty & Co. of Whartons, Ohio, in a letter to the editor of the American Farmer, state that they are now engaged in the manufacture of sun-flower oil, and that they could forward to Baltomore eight or ten barrels immediately, it there was a prospect of its meeting a ready sale. Sun-flower oil is used in York, Pennsylvauia, in paints, in lamps, and as a substitute for olive oil on the table. We use it, and prefer it on all occasions, instead of olive oil. We would recommend a fair trial of it by the painters, and hope the manufacturers will not be discouraged by the want of a market.—[*Ibid.*

THE OPERATION OF POOR LAWS ON AGRICULTURAL INTERESTS.

To the Editor of the Farmers' Register.

I send to you the last number of the Westminster Review, containing a long and valuable article on the present effects of the poor laws, as administered in England, of which I have marked the most important passages for extraction and republication in the Farmers' Register. There is no political institution that promises to affect agricultural interests more deeply than the poor law system, and therefore no other deserves more attention from those who wish to guard and defend the interests of agriculture.

The people of Virginia, as well as those of all our sister states, have copied almost all the politi cal and social institutions of our mother country, England, except such as were manifestly and directly opposed to our free government. From this source we have derived much evil, and still more of good; but we have refused to accept the greatest benefit which the example of England offers, namely, her experience of the evil consequences of some of those institutions which she has fully tried, and which we have adopted without dread or hesitation. The system of poor laws presents a remarkable example of our total disregard of experience and of consequences. Of all the oppressions that bear on the agriculture of England, none is so intolerable as the poor laws system—and there is no other of which the removal or alleviation is so hopeless. Upon all other important features of the policy of that country, honest and intelligent men are found on both sides. But as to the evils produced by the poor laws, there is but one opinion among enlightened men of all parties. That opinion, however, does not suffice to remove, and scarcely to lessen evils which the operation of that system has created and nourished to a most alarming magnitude. Millions of paupers have been brought into existence by the bounties held out by this system, and depend upon its continuance for their sustenance. These bounties cannot be withdrawn; for independent of the claims of humanity and of all other important considerations, the able bodied paupers that would be thus condemned to starvation, are sufficiently numerous to make the whole face of England one wide scene of pillage, conflagration, and massacre. Half a million of men having a common interest, and feeling a common wrong, will not, and cannot submit to a sentence of speedy and certain death from starvation, which would be the effect of a repeal, or even of any considerable modification of the poor laws at this time. Yet with a full opportunity of knowing and profiting by these results, we have commenced in this country the same system, which, in the fulness of time and of events, will surely lead to similar consequences. It may require more than two centuries in Virginia, as in England, before the worst consequences of the poor laws will be felt; and because the burden is yet light, we pay no attention to its slowly progressive, though sure increase of weight. If correct views on this subject prevailed, we still have the power to restrain the evil; but such views will not be acted on, until we shall have lost all power of obtaining relief by proper regulations. The *tax* imposed on us by the poor laws, may as yet be scarcely felt—but the working of the system has been already enough developed to show that in Virginia as well as in England, a compulsory and unlimited legal provision for the poor, represses private and discriminating charity—offers rewards to idleness, wastefulness and debauchery—encourages the increase of unproductive and pauper population—and finally, will produce ten times as much of human misery among the professed objects of its care, as the system can possibly relieve.

The extracts which accompany these remarks offer on unquestionable authority, a number of acts which speak more loudly than any general argument against the poor law system. The whole body of evidence, of which this forms a very small part, constitutes the latest as well as the most full and authentic information of the effects of the system in England on agricultural and national interests. Except the introductory remarks of the reviewer, which will serve to explain the object and labors of the poor laws commission, all the extracts offered are from the evidence obtained and reported by the commission to the government.

A. B.

From the Westminster Review.

In March last, a Board of Commissioners was appointed by the King to inquire into the practical operation of the poor laws. The specific objects of this commission may be learned from the "Instructions from the Central Board to Assistant Commissioners," at the opening of which it is stated, that "the Central Commissioners are directed by his Majesty's Commission to make a diligent and full inquiry into the practical operation of the laws for the relief of the poor in England and Wales, and into the manner in which those laws are administered, and to report whether any, and what alterations, amendments, or improvements may be beneficially made in the said laws, or in the manner of administering them; and how the same may be best carried into effect."* Since their appointment, these Commissioners,—the Central Board by printed queries circulated over the country, and the Assistant Commissioners by personal investigation,—have been actively employed in collecting evidence on the subject of the Commission. The results will be the most important and complete body of evideuce that was ever laid before a House of Commons, on the most vitally important question that ever engaged the attention of a government. The squabbles of foreign despots, the intrigues of diplomacy, the various interests of colonies, distant or near, sink into utter and almost ludicrous insignificance in the eyes of those who have not shrunk from the ungrateful task of watching the progress of a disease that is feeding upon the very vitals of their country.

Extract from the Report of the Poor Laws Commission.

"Mr. Nash, of Roysten, is proprietor and occupier of a farm containing 150 acres, situate a mile and a half from his residence, and in about equal proportions in the parishes of Barhway and Reed, in the country of Hertford. It is what is usually called an outfield farm, being at the extremity of these parishes, and nearly equidistant from Royston, Therfield, Reed, Barhway, and Barley. Mr. Nash employed six men (to whom he gives through

* Instructions, p. 3,

out the year 12s. a week,) two boys, and six horses. In 1829, Mr. Clarke, overseer of Reed, (a respectable man, who occupies half the parish, and has generally managed all its public concerns,) told Mr. Nash he could no longer collect the money for poor rates without resorting to coercive measures, which he would not do; and that the unemployed poor must be apportioned among the occupiers of land, in proportion to their respective quantities; and that he (Mr. Nash) must take two more men. All Mr. Nash's laborers had been some years in his service, and were steady, industrious men, and he regretted the necessity of parting with any of them. The two men displaced were those who came last into his service (and for that reason only.) One was a parishioner of Royston, an excellent workman at any kind of work. He lived near Mr. Nash's house (a great convenience,) and his wife superintended a small school Mrs. Nash had established for the benefit of her poor neighbors. The other was John Watfolk, a parishioner of Barley, a steady, industrious, trustworthy, single man, who, *by long and rigid economy, had saved about* £100. Of the two men sent in their stead, one was a married man, with a family, sickly and not much inclined to work; the other a single man, addicted to drinking. On being dismissed, Watford applied in vain to the farmers of Barley for employment. *It was well known that he had saved money, and could not come upon the parish, although any of them would willingly have taken him had it been otherwise.* Watford has a brother also, who like himself, *has saved money;* and though he has a family, and has been laid aside from work for six years, has received no assistance from the parish. After living a few months without being able to get any work, he bought a cart and two horses, and has ever since obtained a very precarious subsistence by carrying corn to London for one of the Cambridge merchants; but just now the current of corn is northward, and he has nothing to do, and *at any time he would gladly have exchanged his employment for that of day labor, if he could have obtained work.* No reflection is intended on the overseers of Barley; they only do what all others are expected to do; though the young men point at Watford, and *call him a fool,* for not spending his money at a public house, as they do, adding, that then he would get work."

"Since Mr. Senior was at Royston last, week, another instances has occurred on this farm illustrative of the working of the poor laws. John Warren, an inhabitant of Therfield, has been house keeper there for nine years. A few weeks ago, the bailiff told Mr. Nash he could not find employment for so many men. Mr. Nash desired him to dismiss a bankwayman, who happened to have misconducted himself. The bailiff's wife shortly afterwards told Mr. Nash that, if he pleased, John Warren would like to go, as he had a large family, and the justice (the magistrates of the Royston division) would give him as much or more, with work, as he earned, and he should avoid the dirty walks from Therfield this winter. Mr. Nash (who is a proprietor, but not an occupier, in Therfield) has accordingly discharged him and he will no doubt, next week, add 12s. or 15s to the enormous eleemosynary payments made in this disorganized and demoralized parish, by the natural and inevitable operation of the poor laws. Previous to 1814, there were no unemployed poor, and they were remarkable for their industrious and orderly conduct, and all was satisfactory, liberal, and remunerative: now a large portion of the poor have no work, and many lands lie unploughed, covered with thistles, and spreading their seeds with every wind for miles around; and it is said the largest and most wealthy owner and occupier has seen his men steal his corn out of the barns, but would not prosecute, alleging that he must keep them, and that they would live on less if they had the trouble of carrying it away, than if he was to thrash and carry it to Hertford; and bring the produce back to them in money. One of the largest barns on this gentleman's farm has been pulled down piecemeal by the poor, and carried away for fuel. The only probable amelioration of the system may be, perhaps, in appointing itinerant stipendiaries, who should execute the duties of both magistrate and overseer. It is unjust to compel a large occupier, whose business requires more personal attention than that of other men, to give his time and exertion gratuitously to a disgusting public duty—the only reward of which is either a broken head, or the chance of being burnt in his bed."

"*Royston, January 29th,* 1833.

"DEAR SIR,—I write in answer to your inquiry into the case alluded to in the return to your queries from Royston parish, of refusal of employment to laborers on account of their having legacies bequeathed to them. There are obvious motives for disinclination to state particulars, which might be considered to reflect on persons who have no opportunity of giving their own explanations as to the execution of the poor laws. The facts of the case, divested of reference to the locality of its occurrence, are the following:—

"An individual who had risen from poverty, and accumulated considerable personal property, bequeathed legacies to a number of laborers, his relations. Circumstances delayed for several months the collecting in the testator's estate. The overseer's deputy of one parish, in which some of the legatees were laborers, urged to the agent of the executors the payment, *on the ground that it would benefit the parishioners, as when the legacies were paid, they would not find employment for the legatees, because they would have property of their own.*

"The legatees afterwards applied for money on account of their legacies. *It was then stated that some of them, who lived in a different parish, had been refused employment, because they were entitled to property.*

"An occupier of land in another parish near this place told me to-day that in his parish they refused employment to laborers who had money left them. He said that he held 320 acres of light land of the value of 18s. an acre, subject to tithes. He pays £74 tithe composition, and £100 for poor-rates, and is compelled to employ fourteen men and six boys, and requires the labor of only ten men and three boys. His extra labor at 10s. a week (which is the current rate for men,) and half as much for boys, is £130. He pays, in addition, surveyors' and churchwarden's rates. There are sometimes from fifteen to twenty laborers employed in useless public work, besides boys. It is not surprising that, in such circumstances, the

occupiers should refuse to employ laborers who have any property.

"Another occupier stated yesterday that he held 165 acres of land, of which half was pasture. He was compelled to employ twelve men and boys, and his farm required the labor of only five. He is about to give notice that he will quit. Every useless laborer is calculated to add 5*s.* an acre to the rent of a farm of 100 acres.

"The improvement in agricultural implements, the cultivation of artificial grasses, improved roads, and greater skill and agricultural knowledge, enable an occupier to cultivate his land with less labor. All these would be sources of profit, but they are all counteracted and made causes of additional perplexity by the redundant population which the system of the poor laws has augmented.

"It is common for young agricultural laborers to say, that they are treated worse as single men, than they would be as married men, and that they shall marry to better their conditions in this respect."

LENHAM, KENT.

Expended on poor.

	£.		£.		£
In 1816 —	1468	1822 —	2618	1828 —	2482
1817 —	1598	1823 —	2786	1829 —	2611
1818 —	2150	1824 —	3041	1830 —	3040
1819 —	2016	1825 —	3438	1831 —	2679
1820 —	2154	1826 —	2531	1832 —	4299
1821 —	2348	1827 —	2731		

POPULATION.

In 1801	In 1811	In 1821	In 1831
1434	1509	1959	2197

Acres,	6523	Expenditure, March, 1832.	
Rental,	6423*l.*	Casual relief,	1992*l.* 6*s.*
Value,	?	Weekly pay,	1033*l.* 17*s.*
Rates in the £.	12*s.*	Various bills,	1273*l.* 9*s.*
Expected to rise to	14*s.*	Total	£4299 12*s.*

Labor and bills for work on the highways,	£561	
Deduct money repaid by the commissioners,	147	
		414
Total expenditure of Poor and Surveyor's Rates,		£4713 12*s.*

"This is an extensive agricultural parish; much of the land is of poor quality, still there is a considerable quantity of land of a fair average; some is out of cultivation; a large estate has been several years in the hands of the proprietor, and a farm of 420 acres of good land, tithe free, well situated, has been just thrown up by the tenant of another land owner: the poor rate on this farm amounts to nearly £300 per annum. Wages in summer are 2*s.* 3*d.* When laborers are out of employ, or only in partial employ, their wages are made up according to the following scale:

Single man from		3*s.* 6*d.* to 7*s.* 0*d.*	
Man and wife			10 0
Do. with 1 or 2	children		12 0
Do.	3 do.		13 0
Do.	4 do.		14 0
Do.	5 do.		15 6
Do.	6 do.		17 0
Do.	7 do.		18 6
Do.	8 do.		20 0

"The laborers are sent to work on the roads if there is any thing to do, but they are paid according to this scale whether they work or not. On Saturday the 13th of October last, 27 men were paid from 12*s.* upwards each, though no work whatever had been done. There have been 70 men on the roads in one week, paid according to scale: the greater part of the work is unnecessary; besides the wages, tools are provided, and it is calculated that the value of the labor does not exceed the expense of the tools and carting. The average number unemployed from November to May is from 60 to 70. During the harvest they are mostly in employ, but if a man loses a day's work, he comes to the parish to have it made up. Nearly 100 out-parishioners, living at Maidstone, receive occasional or constant relief. There is a man who hires two cows and keep several pigs, who, when out of work, receives from the parish 18*s.* per week. The population of this parish is beyond the demand for labor; but early marriages are constantly taking place without any consideration on that score: of six of these marriages contracted last October, it was expected that most of the parties would be on the parish pay-list in the month of November. A man lately married a girl, who left her place for that purpose on Wednesday; they applied for relief on the Saturday. It will appear from the scale that, on marriage, there is an immediate increase of 3*s.* per week.* The administering relief to from 70 to 100 men on the pay night, in a district near the place where the riots first broke out, and where one of the causes of dissatisfaction was the reduction of allowances," is a duty requiring more firmness than belongs to many overseers; nor is the present state of the rural police adequate to the requisite protection."

"In the year 1830, a considerable reduction of wages had taken place, many men were out of work, and the wages to single men on the parish did not exceed 7*d.* per day. A general spirit of discontent broke out. Incendiarism prevailed to a frightful extent; an eye-witness informed me, that on one night there were three fires burning at once, in the stack yards of farmers within the parish; and that for nearly a month, hardly a night passed without conflagrations in the neighborhood, and tumultuous assemblies of laborers demanding a rise of wages. Under these alarming circumstances, a meeting was called, and an agreement made that the wages should be 2*s.* per day for an able-bodied married man, 1*s.* 6*d.* for a single man of 18, and from 3*s.* 6*d.* to 5*s.* per week, for boys from 15 to 18. That the surplus laborers on the parish should be paid according to the following scale:—

Single man, 18 years of age,		6*s.*	per week.
Man and wife,		9*s.*	do.
Do. with 1 child		10*s.*	do.
Do. 2 children		12*s.*	do.
Do. 3 do.		12*s.*	do. and a gall. of flour, or 13*s.* 4*d.*
Do. 4 do.		12*s.*	do. and 2 gall of flour.

And so on till, for ten children, the pay might amount to 18*s.* 8*d.* per week. A discretion was

*In the workhouse there are 35 inmates. Young men have been sometimes sent there, but they have said, "you put us in to punish us; we will only marry the sooner."

given to the overseers to grant the flour, or place the children in the poor-house; the latter measure is so unpopular that they dare not put it in practice. The effect of this forced rise of parish pay was soon apparent: the sale of the farmer's produce could not suffice for both wages and rates; a most injurious transfer took place of a portion of the sum expended on labor to the account of rates. The principal occupier in the parish states the relative proportion on his farm to stand thus in round numbers:—

1830.		1831.	
Labor - -	£900	Labor - -	£700
Rates - -	300	Rates - -	500

"This scale of wages has been continued to those on parish pay to the present day. Being secure of good wages for mere nominal work, the ill-disposed and idle throw themselves willfully on the parish; the effect is most ruinous on the small householders, who being already on the verge of pauperism, may be converted, by a slight addition to their burthens, from payers to receivers of rates. They have no means of protection, but by uniting for the purpose of an expensive litigation; and have not the opportunity, like the farmers who constitute the select vestry, and are principally tenants at will, to throw part of their burthen on their landlords. From a printed statement of the expenditure of the parish, are taken the following items of sums received by families of paupers:—

John Carter, bricklayer, aged 43, wife, and 5 children, at an allowance of 14*s.* 8*d.* per week, cost the parish last year - - -	£42 12 4
Joseph Carter, 34, wife, and 7 children, 16*s.* 8*d.* per week - -	49 11 8
J. Mitchell, 46, wife and 2 children, 12*s.* do. - - - - -	35 4 0
G. Paul, 50, fisherman, do. do. 15*s.* 6*d.* do. - - - - - -	25 8 9½

"This lavish expenditure, which has been extorted by the violence of the able-bodied, is not extended to the aged and infirm, the proper objects of the poor laws, as may be seen by the following items:—

Mary Carter, widow, aged 76, at 2*s.* 6*d.* per week. - - -	£6 10 0
Lydia Collins, widow, aged 90, at 2*s.* per week - - - - -	5 4 0
Ann Chapman, widow, aged 75, at 1*s.* 6*d.* per week - - -	3 18 0

"In the month of December, 1832, four healthy young men, received from 12*s.* to 14*s.* per week from the parish, refused to work at thrashing for a farmer at 2*s.* 6*d.* and a quart of ale per day, and the only punishment inflicted on them by the parish officers, was taking off half a day's pay, 1*s.*; at the same time, a poor widow, aged 75, could obtain but 1*s.* per week for her support from the vestry. The fishermen being secure of pay without labor, refuse to go out to sea in winter: one has said, 'why should I expose myself to fatigue and danger, when the parish supports my wife and pays my rent?' The masters in the fishery have in consequence been forced to send to Hastings for hands requisite to man their boats. Rent of cottages is generally paid for families of three children, to the annual amount of £307. Since the time of the riots, and the establishment of the present scale of parish wages, the vestries held every fortnight for determining relief, are very ill attended—the parishioners seeming to despair of any improvement; and anxious hopes are expressed of the interference of government."

"In Dun's Tew, as in all the Oxfordshire parishes, the early marriage of mere boys is frequent, for the avowed purpose of increasing their income by allowance for increase of children."

"A debt of £700 was then due from putative fathers; sixty-seven bastards were on the books; one woman had borne seven, and had received pay for each. The parish itself was in debt to the amount of £500, the residue of a debt of £1100.

"It has been the practice here to relieve men with families, without inquiring into the amount of their earnings, and not to refuse relief unless they were shown to exceed 25*s.* a week. The people are chiefly engaged in the manufacture of nails. A large family is considered to be a source of profit. Women object to marry till they are pregnant."

"The check to the circulation of agricultural labor is too notorious to be talked of. The case of a man who has worked for me, will show the effects of the parish system in preventing frugal habits. This is a hard-working, industrious man, named William Williams. He is married, and had saved some money to the amount of about seventy pounds, and had two cows; he had also a sow and ten pigs. He had got a cottage well furnished; he was the member of a benefit club, at Meopham, from which he received 8*s.* a week when he was ill. He was beginning to learn to read and write, and sent his children to the Sunday School. He had a legacy of about 46*l.* but he got his other money together by saving from his fair wages as a wagoner. Some circumstances occurred which obliged me to part with him. The consequence of this laboring man having been frugal, and saved money and got the cows, was, that no one would employ him, although his superior character as a workman was well known in the parish. He told me at the time I was obliged to part with him—'Whilst I have these things I shall get no work. I must part with them all. I must be reduced to a state of beggary before any one will employ me.' I was compelled to part with him at Michaelmas—he has not yet got work, and he has no chance of getting any until he has become a pauper; for, until then, the paupers will be preferred to him.

"Such an instance as that of William Williams is enough to demoralize a whole district. I say, myself, that the laboring man who saves, where such an abominable system prevails, is foolish in doing so. What must be the natural effect of such a case on the mind of a laboring man? Will he not say to himself, why should I save? Why should I diminish my present scanty enjoyments, or lay by any thing on the chance of my continuing with my present master, when he may die, or the means of employment fail him, when my store will be scattered to waste, and I shall again be made a pauper like William Williams, before I can be allowed to work for my living? This system, so far as relates to the circulation of labor, I am firmly persuaded can only be put an end to by utterly abolishing the law of settlement, and establishing a uniform national rate, so as to allow a man to be relieved at the place where he is in want, instead of his being pinned to the soil."

IN-DOOR PAUPERS.

St. Lawrance, Reading.

"I began my inquiries of the governor [of the poor house] by asking him what quantity of food he gave to those under his charge? "Quantity! why, a bellyful. We never stint them. I stand by the children myself, and see that they have a bellyful three times a day."

"What description of food do you give them?"

"Good wholesome victuals as any body would wish to taste. You shall taste it yourself. We give them all meat three times a week. The working men have a bellyful. We never weigh any thing, and there is no stint, so as they do not waste anything. Then they have good table beer and good ale."

"How many paupers have you generally in your workhouse?"

"From forty to fifty."

"And what is the quantity of meat usually consumed weekly by that number?"

"Seldom less than 150 pounds meat."

"Do you find them in tobacco or snuff?"

"No, sir; but if they get a few pence, or if their friends choose to give it to them, we do not debar them from anything, so long as they do not make beasts of themselves."

"I requested to be shown the house. Everything appeared remarkably cleanly and in good order. He requested my particular attention to the goodness and cleanliness of the sheets and bedding, and the general comfort. He dilated on the quality of the bread, which he showed me. He also gave me some of the table beer and ale to taste. I must do him the justice to state that it was excellent. The table beer was such as in the metropolis is called table ale. But besides these liquors for the use of the paupers, he produced a third specimen, still superior, of which I tasted. This was a most potent beverage. It was two years old; and he said he generally reserved it for the overseers after the performance of a dry day's work. The paupers themselves appeared to be very strong and healthy, and the children the most so of any that I had observed in the district. He pointed out to me one pauper, a remarkably hale-looking man of 63, who had, with his wife, been on the parish more than 40 years, and in all probability would live more than half that time longer on their charge. The governor, it appeared, had been a farmer many years ago. I asked him.—

"Do you think the condition of these paupers better or worse than the condition of the agricultural laborers thirty or forty years ago?"

"A great deal better off than the laborers forty years ago."

"Than the agricultural laborers of any class?"

"Yes, sir, I know they are a great deal better off."

"And what is the present condition of the independent laborers, as compared with that of the laborers at the time you mention?"

"I think they are not quite so well off. To be sure, they got less wages, and clothing was dearer: they only got 7*s*. a week. But then on the other hand, they only paid 8*d*. for the gallon loaf. I think they were better off. There are too many laborers now, and labor is more uncertain than it was then."

"I may say, then, that not only is the condition of those under your care better, as regards food, clothing, lodging, and comfort, than the laborers who toil out of doors; but that they are under no uncertainty, and have no anxiety about providing for themselves?"

"Yes, sir, you may say that. You may say, too, that they are better off than one-half of the rate-payers out of the house. I know the rate-payers; I know what it is to be a rate-payer, and I know that a great many of them are worse off."

"In the course of my inspection of the workhouse, I observed that the men's rooms were all locked. I inquired the cause of this—"that they may not come in and lie down before bed time."

"That is, I suppose, that they may not escape from their work?"

"No, sir, we have no work here, even for those that might work; it is that they may not come up here and lollop about and roll about in their beds after dinner, or when they are tired of doing nothing."

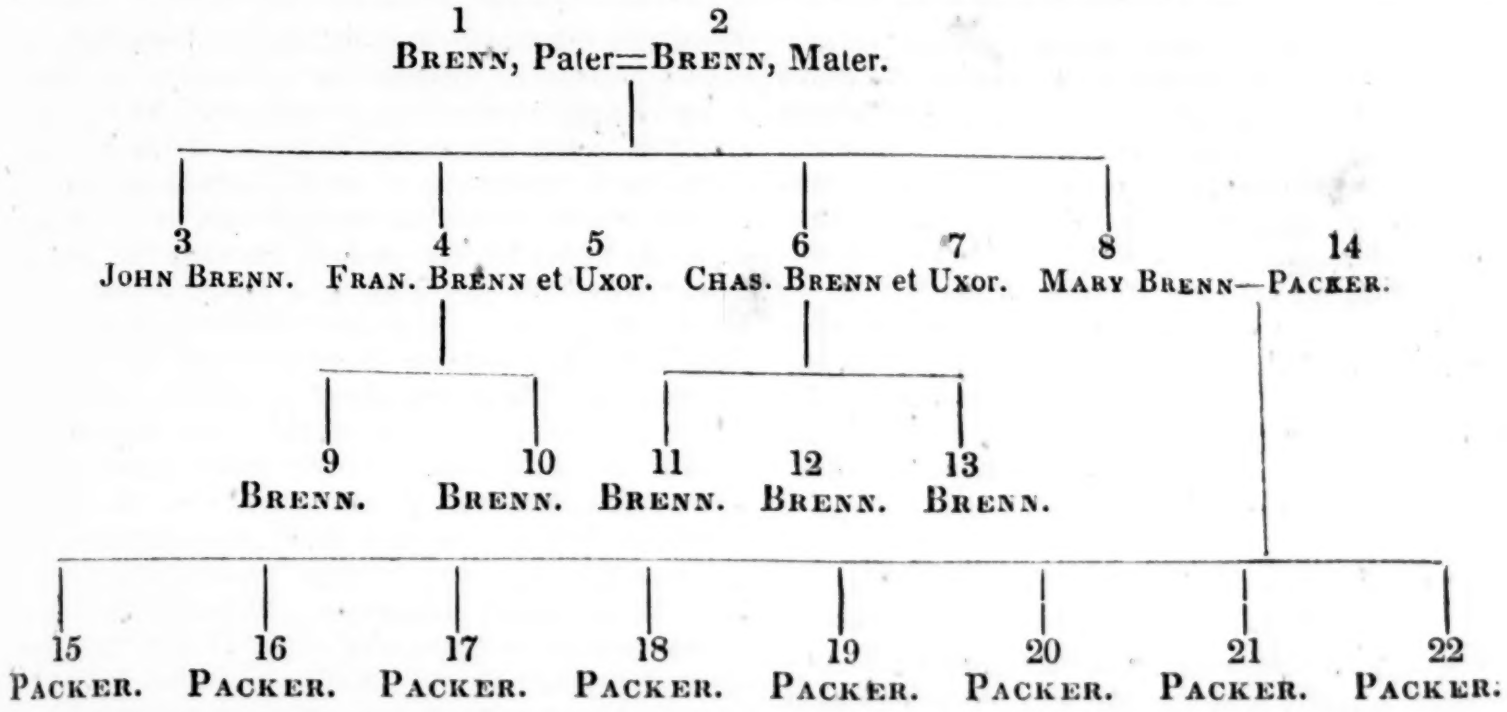
"How does this sort of life agree with them on their first entrace?"

"Wonderfully well in general. Sometimes when they come in very low, and on the brink of starvation, the great change in the way of living is too much for them; but when they get over the change they go on surprisingly. Their friends, when they have any to come to see them, have sometimes been quite surprised at the change, and hardly knew them again, they were looking so well. We had an old women brought in not long ago; she was so very low and feeble, that you would have thought it impossible she could live long; but now she is one of the most active women of her age, and will live, I dare say, a great many years more; they will say themselves they never were so well off before. There are some, it is true, who cannot bear even our regularity, and prefer the dog's life of hunger and liberty; but in general they never leave us."

"In answer to my interrogatives, as to the general character of the inmates he deciared that the great majority of them were undeserving characters who had been reduced to poverty by improvidence or vice.

"The male and female paupers were separated in the night, but in the day the young girls, and the mothers of bastard children, and all classes, might meet and converse together in the yard.

On examining the books containing the list of the out-paupers, I found the management equally characteristic; out-door paupers having nearly the same amount of wages allowed them without work, that could have been obtained by independent laborers by hard work; the pauper having, in addition to the money payments, frequent allowances of clothes from the parish, and payments on account of rent, and 'other advantages.' I made inquiry into the case of the persons by the same name first presented on opening the book, when I found them to consist of a pauper family of three generations, the whole of whom received upwards of 100*l*. per annum from the parish. The parents of the pauper stock were described as remarkably hale old people, in the workhouse, who had lived on the parish upwards of forty years. The father was the man who had been pointed out to me as an instance of the care taken of the inmates, he had lived so long and so well on the parish. I took down their names in the order which exhibits the genealogy of the *living* pauper family:—



"I asked the governnor how this last and most widely-spreading branch arose? 'That,' said he 'was one of our overseer's doings. I warned him against it, but he would do it. Brenn's daughter became pregnant by a weaver named Packer, and the overseer made him marry her; and see what the parish has got by it!—eight more mouths to feed already, and eight more backs to find clothes for.'

"How many more paupers do you consider the parish may receive from this said stock?"

"Two or three score, perhaps."

For the Farmers' Register.

FRAGMENT OF CONVERSATION.

* * * * * *

A. Pray, sir, what caused the embarrassments of your former neighbor, and my old acquaintance N.? I always thought him very industrious, and not addicted to expensive habits; and was, therefore, much surprised to hear that so little of his fine estate was left after paying his debts.

B. Why, so he was industrious, and he spent as little in his housekeeping and manner of living as many prudent men of half his income. But notwithstanding his industry, his increasing attention to his farm, and his frugal habits, (or what he considered such,) he was ruined by his extravagance in what you book-farmers are so fond of—making experiments. He was never satisfied with making his corn, or sowing his wheat, or putting out his manure, or feeding and keeping his live stock as other people did—and he kept changing his plans, and losing by almost every change, until if he had lived a few years longer, he would have had nothing more to lose.

A. Your explanation serves to increase my surprise. It is very true, that as all agricultural experiments are trials of new and doubtful practices, and made to establish facts, and not to make profit, it must be expected that they will generally be more expensive than profitable, immediately. But though N. might thus lose by his experiments while making them, he ought to have gained afterwards, by adapting his general practice to the truths which he had proved by his experrments.

B. Aye—it is easy to talk finely and give plausible reasons for such doings; but whoever takes to making experiments, will be very apt to suffer as poor N. did.

A. But was he so obstinate as to adhere to a practice after his experiment had shown that it was wrong? If so, his experiments were made to but little purpose.

B, No, no. He was ready enough to give up his notions as soon as they were tried in practice and failed. But he was scarcely out of one losing business, before he was over head in some other. He was always about to reap wonderful profits from some new scheme, which he rushed into as far as his means allowed. When he first began farming, he was full of making all his poor land rich, off hand, by the directions out of his books about clover and plaster. That scheme lasted until he had thrown away perhaps $500 in money and labor, without any return worth naming. In the mean time he was buying at enormous prices, England bulls and cows, hogs and sheep, all of which turned out as badly as the fields of clover that they were to live upon. He afterwards built an expensive mill, with works for various kind of machinery on an insufficient water-course, expecting to bring a plentiful supply by a canal from another stream which was two miles distant. But after digging the canal, the source of the water was found to be on a lower level than the mill; and as it could not run up hill, all the labor was lost. And so he went on with experiments to the last.

A. Now I begin to understand you; and I differ with you altogether in the use of your terms. If such as these were the experiments that N. was in the habit of making, I should say that he lost his property not by making experiments, but by *not* making them.

B. How is that?.

A. Why, it seems that he made no experiment on a small scale to ascertain whether a practice was correct, but at once went as fully into it, as if he had already proved, and was certain of its value. This course is in fact rejecting all the lights of *experiments* as well as of *experience*, and instead of them, taking as a guide every wild and untried speculation that can be conceived. But as you feel so much contempt for *book-farmers* and their experiments, tell me what guide do *you* follow, in cultivating your land?

B. Why, *my experience*, and the experience of my father and grand-father; and we have all profited by pursuing the same general practice.

A. Well—*experience* (both according to the

dctionary and to common sense,) means simply ihe knowledge gained from experiments and practice. Every process you use in tilling and taking care of your corn or tobacco, was once a *new* experiment: and though it probably was not conducted to the best advantage, its known or supposed beneficial result must have been the foundation of what became the regular practice. So far as your practices are good, you are indebted altogether to experiment for the advantage; and if any of them are wrong, it is either because the experiments were not fairly tried, or that a practices is continued after the circumstances that required it have ceased to operate.

MEANS FOR REDUCING SEA SHELLS.

From the (Edinburgh) Farmer's Magazine.

SIR,—The following little improvement of a manure, already well known and very valuable, may, I hope, be deemed worthy of a place in the Farmers' Magazine.

Along our sea-coasts, where the ebb tides leave tracts of dry sand, there are frequently found beds of sea shells in a more or less broken and decayed state. A gentleman, whose farm is situated near some banks of shells of this description, has discovered a very ingenious method of hastening the dissolution of those shells. I need not add that shells operate the sooner by being pulverized. In order to reduce them to this state, he makes the quantity he has occasion for, the lowest tier of his dunghills, upon which he throws the dung of his stables and byres; and when the time for applying these middens to his fields arrives, he finds the shells almost if not entirely reduced to powder. I have only to add that the discovery was, like many other valuable discoveries, the effect of mere accident. It happened to be most convenient to fetch the shells to the dung-court, just after it had been emptied of its winter contents; of course it was also most convenient for his people to throw the dung of the offices over the shells. He was agreeably surprised to find this disposition of his office dung had produced the unexpected but happy effect of pulverizing the shells. I shall leave more expert chemists to explain the reason of farm dung dissolving shelly sand. DOMESTICUS.

For the Farmers' Register.

A REMEDY FOR THE GAPES AND SNUFFLES IN YOUNG TURKEYS.

As the editor of the Register does not exclude from its pages the experience of the females in their department, but politely solicits their interest and patronage, I will take the liberty of inserting an article which (though it does not come under the head of marl, or practical farming,) may not be altogether disregarded by some of the housewives who may have suffered in the same way.—This spring I had a most promising parcel of turkeys, which grew off finely till they were about three or four weeks old, (the time most general for them to take the above mentioned diseases,) when they all at once became sick, drooped and died four or five a day, till the number of 60 was reduced to 20. I was so discouraged and indifferent about the remaining few, as half to wish they too would gape and snuffle out their lives; but on the suggestion of one more experienced than myself, I was induced to use sulphur, which did directly and effectually stop all further mortality. I cannot pretend to discuss the medicinal qualities of the remedy prescribed, or reason on the matter, either as to the nature and cause of those two diseases, or the operation of the brimstone on them; but the trial has been so satisfactory, as to determine me hereafter not to defer its use, but begin moderately from the first, and thereby lessen, if not wholly prevent, any such affection, and continue it till they become large enough to require no feeding. The methods of giving it is simple; once a day will answer—oftener may be injurious; if regularly observed for some time, once will be all sufficient. A tea spoonful to as much dough as they can eat at a meal, was the quantity given to 20; of course a large number would require an increased proportion. Should it be a fact with regard to turkeys, why may we not hope the same for other young fowls—chickens particularly? I do not lay it down as a thing certain, or unfailing, because my success has been so marked, but only recommend it to others as worth the trial, with the concluding assurance that not a single one died under the practice. A FARMER'S WIFE.

June 22, 1833.

A FARMER'S WIFE is *doubly* welcome, as being our earliest female contributor. We request a continuation of her favors, and hope that her example, in this respect will be followed by many other housewives.

For the Farmers' Register.

EXTRACTS FROM PRIVATE CORRESPONDENCE.

Sorrel growing on marl.

Williamsburg Jan. 15, 1833.

* * * * On a recent visit to my farm, one fact struck me with considerable surprise, as it seemed to be inconsistent with one of your leading principles respecting calcareous manures. The marl which I am now using is very strong, supposed to contain $\frac{75}{100}$ of lime, and is in heaps of from four to five bushels. On these heaps I observed sorrel was growing in bunches of considerable size. Will you have the goodness to account for this fact? It seems to me that I can never get clear of sorrel by the use of marl, since it grows on a marl bed. Your experience, however, may explain this effect, and assist my future use of the manure. * * * * *

Answer.

* * * * My own experience, more than ten years ago, furnished me with several opportunities of observing facts similar, to those you describe—and like yourself, I was alarmed at first, at what seemed to be a positive contradiction of my previous opinion, that calcareous manures in sufficient quantity rendered a soil incapable of supporting the growth of sorrel. But further observation served to remove these fears, and even afforded additional proof of the general position before assumed. Where I found sorrel growing on heaps of marl, it was under these circumstances: the loads had been dropped on acid soil (subject to produce sorrel) and had remained without being spread, perhaps twelve months. By carefully removing the marl from the plants, I found that they had sprung, not from the marl, but from the acid soil below—and that the communication between the soil and the air, where the leaves opened, was through a single tap-root, which merely passed through the heap of marl, without drawing any

sustenance from it. The plants were usually where the marl was thin, near the edges of the heaps—but one of the roots which I examined was of the remarkable length of nine inches: it had thrown out a few horizontal fibres of about an inch in length, as if in search of nourishment, but which were then (some time in June) quite dead. The few plants then observed, though full of the coverings for seed, yet were quite destitute of the seeds which should have been within: but this remarkable abortion, though often to be seen under like circumstances, is not general.

Calcareous earth alone is insoluble in water, and can in no way affect growing plants except when mixed with, and acted on by other substances in soils. A load of marl dropped on the surface of the land and left undisturbed, can have no more effect than so much silicious sand, or any other substance of like insolubility, weight and texture, though perfectly worthless and inactive as manure. Marl if thinly spread, though left on the surface, in the course of time would have all its finer parts carried down into the soil by the rains; and thus, ultimately, would act as a manure. But even this slow effect would be prevented by the thickness of a cart-load of marl, which would shelter the covered soil from rain, except what it could imbibe slowly by absorption. By thus calling to your mind the existing circumstances, and the insoluble quality of calcareous earth, you will see that in no way could your marl exert its chemical power of neutralizing the acid quality of the soil; by which means only, it destroys the growth of sorrel. The germination of the seeds at such depths, and the rising of the plant through such a layer of dead earth, (as marl is in such cases,) proves the remarkable hardiness of sorrel; but its growth in such situations furnishes no proof whatever, that marl when acting as a manure is not destructive of sorrel. To produce this effect, it only requires that a sufficient quantity shall be applied, and equally and thoroughly mixed with the soil by tillage. If plants of sorrel are found on a field that has been sufficiently marled, and the soil well stirred by cultivation, it only proves that from careless spreading, those spots were left without their share of the dressing. But should my reasoning be not entirely satisfactory, you may rely on the testimony of my experience, which pronounces that sorrel will never be found plenty enough to be injurious after even a moderate-marling, and that after a proper application, "the soil is found not only cleared of sorrel, but incapable of producing it."

* * * * * * * *

Since answering your letter, I have examined many plants of sorrel growing in my heaps of marl which were dropped last year on a poor broom-sedge field. Contrary to my former opinion, I found that the slender horizontal roots stretched through the marl, sometimes eight or ten inches, and were alive early in the spring. But by the middle of June, they were either dying or dead. In one plant only, I found that a horizontal root after passing nearly a foot through the marl, had struck the soil below, and had become nearly as large as the main tap-root. These roots, so long as they are altogether in the marl heap, instead of drawing support for the plant, are themselves sustained by its juices, drawn through the main root from the acid soil. In every case, the only important fact is uniform—namely, the principal root of the sorrel being fixed in the soil below the heap of marl.

—

Hanover, Jun 18, 1833.

* * * May I suggest the propriety of calling the attention of your readers to the danger of suffering servants to have hog-pens, manure, and litter, about their houses? About five years past, I had a very sickly family of negroes at a farm near Richmond, two of whom died; the hog-pen was very near their dwelling; a subsequent event induced me to think the disease (which was typhus fever with sore throat,) was at least aggravated by the pen. This has always been considered as healthy a place as any in the neighborhood. Some few months after, two white persons in this county died, as the attending physician thought, from neglecting a hog pen: a third was ill, but was removed, and recovered. Is it not probable that many farmers suffer accumulations to take place of what may render them unhealthy? If you think so, a few lines from you might put some on the alert.

We concur entirely in the opinion of our correspondent, which we cannot exhibit better than by extracting his own words. He will see that the same subject has already been treated of in the earlier part of this number, (page 77.)

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Calcareous Manures of Central Virginia.

Prince Edward, June 20, 1833.

I have spread marl on between twelve and fifteen acres in all—but, apprehend rather sparingly. Its effects are very perceivable on the corn—the cotton and tobacco are not yet sufficiently advanced to show its efficacy. I think, however, the texture of the soil is manifestly improved. A small spot in clover was heavily covered on the third of April, and although there has been no opportunity for the marl to freeze, the crop, I think at least doubles that on the adjoining land. I had no clover growing near the marl beds, or I would have tried it more extensively. The extreme wetness of the season has put a stop to that and indeed to almost every other agricultural operation. The wheat crop is deplorably damaged. The corn is yellow, from rain and smothered by grass; and on low grounds, much of it entirely destroyed. There is a prospect for a great oat crop. I intend to make arrangements for spreading marl much more extensively as soon as the weather becomes dry, should that occur at all this season.

My other avocations have entirely forbidden any special researches on the subject, but I cannot help hoping that there will be marl found in many places where I had not hoped for it. I received, a day or two past, a large calcareous concretion from the northwestern part of Lunenburg, and I learn that Col. Asa Dupuy, of the south eastern part of this county, has found marl on his land. He lives about ten miles, I believe, to the east of the stripe of land before supposed to be the extent of the secondary formation. I learn, also, that there is an abundance of it in the county of Mecklenburg. I think it highly probable that there is much land of secondary formation between this and the head of tide-water; and, of course, that there may be

much marl found in it. I am much better acquainted with the country between here and the mountains, and am inclined to think it chiefly of primary formation. The resource for calcareous manure on which this latter country must rely, depends chiefly on some ranges of limestone rock which pass through it. A few miles to the west of Liberty, in Bedford, some limestone quarries have been opened; and there are three strata passing through Campbell and striking James river, near Lynchburg. * * * * *

Could you sum up for the Register, some of the best reasons for the formation of agricultural societies, it might, probably do much good. I believe that such institutions would greatly co-operate with a good periodical, in producing the best results. Indeed, I doubt whether without them, a true spirit of improvement can be diffused through the country. * * * * *

THE IMPORTANCE OF INVESTIGATING THE MINERAL RESOURCES OF VIRGINIA FOR PROMOTING AGRICULTURAL IMPROVEMENT AND NATIONAL WEALTH.

Extract from an Address delivered by J. P. Cushing, A. M. President of Hampden Sydney College, before the Historical and Philosophical Society of Virginia.

"Geology, although it presents a most interesting field of inquiry, has received but little attention until within a few years past. In former times geology consisted of a series of visionary speculations to account for the formation and changes of our globe; but within the last half century, it has assumed an entirely new character, and has now become a science reared upon numerous and accurate observations of facts and therefore, has assumed a rank among those sciences which stand upon the basis of induction. It is not difficult, now, for a skilful geologist, from an examination of the exterior substances of the earth, to become acquainted with its interior structure.

"In America, there were no combined efforts made for investigating the geology of our country, until 1820, when the men of science in different parts of the United States assembled at New Haven, and formed the American Geological Society. Through the influence of that society many parts of our country have been explored, and a mass of geological facts and specimens collected together and noticed by our scientific journals. Thus, an interest has been excited, which promises much for the future.

"The science of mineralogy, which is intimately connected with that of geology, is also in its infancy in our country. This science has a very important and extensive range; its object is to describe and classify the different objects of inorganic matter, and to explain their peculiar properties and uses. Every substance which is not the immediate product of some organized body, belongs to the mineral kingdom; and all such substances are divided by mineralogists into four clasess. (The first includes all earthy compounds, such as the topaz, quartz, diamond: the second, saline substances; the third, inflammable bodies, such as sulphur, coal, peat, &c.; the fourth, metals or metallic ores.) The importance of this science cannot be well overrated. Whether it be viewed as tending to increase individual wealth, to improve agriculture, and multiply arts and manufactures; and thus promote the public good; 'or as affording a pleasant subject of scientific research,' it recommends itself to the attention of the citizen, and the scholar.

"The mineralogy of the United States is now admitted to be as rich and as valuable as that of any other country. Our statesmen of enlarged views, as well as the devotees of science, have, for some time past, perceived the immense advantages that will be derived to our country from a thorough investigation of its mineral treasures. To secure this important object, geological and mineralogical societies have been formed in nearly all of the old and in many of the new states. Within the last ten years, the legislatures of Massachusetts, New York, Kentucky, Tennessee, North and South Carolina, Georgia, and probably some others, perceiving that a correct knowledge of their mineral resources, and a proper application of them, would greatly increase their physical power and means of internal improvement, have appropriated from time to time, funds, to secure accurate and minute geological and mineralogical surveys of their respective territories. In this way, all their citizens have it in their power to ascertain the properties and locations of the different species of rocks, ores, coal, natural soils, chymical manures, and mineral waters, in each section of the country. Thus, the interest of individuals, and of the state, as well as of science, are promoted.

"Thus far experience has proved that the more the mineral treasures are explored, the more they abundantly repay the research; and we trust that shortly, we shall no longer ignorantly tread under our feet or permit to remain unobserved minerals of great curiosity and value, and 'import from other countries, frequently at great expense, what we possess abundantly, at home.'

"There can be no doubt, sir, but that Virginia is *as rich* in geological and mineralogical productions as any of her sister states. The aspect of our country is marked by striking and prominent characteristics, indicating a great variety in its geological structure. Our mountains and valleys contain valuable minerals, and abound in medicinal waters, and the middle and lower sections of the state, possess many highly important chymical and mineralogical formations. But, as yet, these subjects have been but little attended to, by our citizens.

"Without attempting a complete enumeration of the various minerals which have already been discovered in the state, we will mention some of them. Many of the rocks belonging to the three great classes, viz. the primitive, secondary, and transition, have been found here. Among the number, are, granite gneis, mica, quartz, soapstone, schorl, asbestus, hornblende, garnet, and limestone. Also some of the more important metals have been discovered, viz. tin, zinc, lead, copper, silver, iron, gold, and barites. Besides the substances mentioned, chalk, salt wells and licks, coal, gypsum, and several species of marl, have been long known to exist in the state.

"The limestone of the valley is of very good quality, and, as our internal improvements progress, will increase in value. It is said there are different species of marble in the neighborhood of James river, which could be used in the arts to great advantage. The western mountains contain

inexhaustible mines of iron ore, of the richest quality; some of them are worked with considerable profit. The salt works in Washington county are, in time of peace, a source of great profit to the owners, and an extensive convenience to a large section of the western country, but in time of war, they will prove to be national blessings. Bituminous coal has been discovered in various parts of the state; extensive mines of it, we all know, have been worked to great profit for many years. This coal possesses some valuable properties, which will secure for it an increasing demand from abroad. The gypsum found in Washington county, in great quantities, is said to be as valuable as that brought from Nova Scotia, and is now applied to similar purposes, by the farmers of western Virginia and Tennessee. Plaster, in small quantities, has been also found in many other parts of the state; and it is probable, that if proper search were made, valuable beds of it would be discovered both in middle and lower Virgima.

"In almost every section of lower Virginia there are immense beds of marl, containing from sixty to eighty per cent. of lime. Until lately this marl has been considered by the inhabitants of that country rather a nuisance than a blessing. But, within a few years past, some of their more enlightened farmers have made many conclusive experiments with marl as a manure in cultivation, and have proved that their marl and other marine deposits constitute an invaluable treasure, and if properly applied, are capable of redeeming and greatly enriching the whole tide-water country.

"Permit me to observe, sir, in passing, that the spirit of inquiry on this subject has been excited principally by the successful experiments and judicious observations on calcareous manures, which have been carried on for the last ten years by Edmund Ruffin, esq. of Prince George. From the work on calcareous manures, which he has lately given to the world, it is evident that he is not only a *practical operator*, but a *scientific cultivator*. His book is a work of solid merit. All such efforts augur well for the agricultural interests of the state.

"But to return. The mineral springs among our western mountains are not surpassed, in variety or medicinal properties, by those of any other country in the world. Chalybeate springs are found in every section of the country. The Hot and Warm, the White, the Salt, and the Red Sulphur springs, possess properties peculiar to themselves, but all of them have been found efficacious in the cure of those diseases incident to our cities and alluvial country. It is to be greatly regretted, sir, that these springs have not been accurately analyzed, and their properties made known to the world. Such an analysis would be of incalculable benefit to the public at large, but especially to physicians and patients, who reside at a distance.

"This concise enumeration includes nearly all the mineralogical facts which have been discovered in the state. But these facts, when we take into consideration, that most of them were discovered by accident, are sufficient to prove, that, in all probability, the mineral resources of Virginia are very extensive and valuable. It is believed, that there but few subjects more worthy of public patronage, or that would be productive of more extensive benefits to our citizens, than a complete geological and mineral survey of the whole state. But we have no reason to believe that this desirable object can be secured immediately. There is, however, no doubt, but that this society can, by its united efforts, render important aid for its accomplishment; by collecting and classifying the various minerals, geological facts, and natural curiosities, which may be obtained from all parts of our country. In this way it will not be difficult to form an extensive cabinet of minerals, and a museum of natural curiosities here at the capital of the state. Such an establishment will be not only an object of interest to all intelligent visitors, but a source of highly important information to the naturalist, agriculturist, and statesman. If our legislators will co-operate with us in this enterprise, they can give us important assistence, by affording a medium of direct and easy communication, annually, between this society and every citizen in this commonwealth. When it shall be generally known that there is established at the seat of government, a common place of deposite for minerals, and that those specimens which are forwarded to it will be examined and perhaps analyzed by competent persons, there will be no difficulty in rapidly increasing our cabinet. I apprehend, sir, that, as we progress in collecting specimens, men of science, for the sake of their own improvement and that of others, will most willingly assist in examining and analyzing them. By these simple means much valuable information can be distributed among our citizens, and great good be done."

PRESERVING BEES IN WINTER.

From the Genesee Farmer.

Bergen, Genesee Co. May 17, 1833.

Mr. TUCKER:—I have seen several articles on the subject of bees in your valuable paper, the Genesee Farmer, and being a subscriber, I wish to give to the public the fruits of my experience. I have kept bees for fifteen years. Last spring a frend of mine told me if I would bury my bees in the ground I could keep them through the winter in that manner; accordingly I buried two hives that had but very little honey. I was confident that they would not winter for the want of food; I therefore thought I would try the experiment. I took them from the ground the 18th day of April and found them in good health. They had not made use of the honey, as there appeared to be as much honey in the spring as when I put them in the ground. They must be buried below the frost, and in such manner as to prevent the air from coming to them. H. D. GIFFORD.

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On this subject, we find the following paragraph in the newspapers—where it originated we know not:

Preserving Bees in Winter:—Mr. Etheridge, of Montrose, Penn., who keeps a considerable quantity of bees, buried seven hives in the ground last fall by placing them in the ground, covering them first with straw, and then burying them in the earth to the depth of about ten inches. About the first of the month he took them out, and found them to be in excellent condition. Some of the hives when buried were poorly provided with honey, and Mr. E. is of opinion that they could not have been preserved through the winter in the ordinary way.

PINE LEAVES ON MARL.

To the Editor of the Farmers' Register.

June 17, 1833.

I give you the result of an application I made this year of marl combined with pine leaves; I took a piece of land, of equal texture, and well adapted to the culture of wheat and corn, where the strength was as generally diffused, as any I could find. A part I marled, and gave it a covering of leaves; a piece adjoining, I did not marl, but gave it a coat of manure, principally from the stable, and fallowing the whole, which I put in corn. The difference at the present time, though the crop is not half matured, is very perceptible; that which was marled, in conjunction with leaves, is fifty per cent. better, in size and color, than that which was manured only. Hence I am of opinion, that in eastern Virginia, where pine is the spontaneous production, and very abundant, that a person cannot have a more economical or better dressing for their land when united with marl.

EXPERIMENT.

SILK CULTURE.

To the Editor of the Farmers' Register.

SIR—I was much amused to-day in reading your intelligent correspondent's letter on the subject of grafting the white mulberry. It reminded me of what I have often ridiculed in our Virginia character—our peculiar habits of splitting hairs, and controverting every assertion, however trivial the subject matter asserted.

Of every species of tree that I know, the white mulbery is the easiest to propagate; and this is not only established by experience, but by every book that treats on the subject. The best method I have tried is by seed, if it is intended to feed the silkworm; but for this purpose I should greatly prefer the common red; either are good and easily raised.

In two years, I have been able to rear trees, both white and red, to feed, without injuring the trees 15,000 silk worms; and if I chose to encounter the trouble of a second crop, would furnish leaves for double that number. I should however not regard the trouble of growing a second crop of silk this season, if I could receive a willing support from my family and those around me. But this want of support in my family will drive me from the culture of silk after having laid the foundation of a small establishment, which I had flattered myself might be made profitable through the agency of my three hearty healthy and intelligent daughters.

It is impossible sir, to resist the force of example and the habits of those with whom we associate. My girls are the very life of the society with whom they associate, and might make any thing they would undertake popular; but as all Virginia people, want perseverance, the young ones cannot stand the prejudices of the old folks that are around them. However, this spring I availed myself of having them at home with me alone; we undertook to hatch 10 or 15,000 eggs, and in 36 days we succeeded in forming about two bushels of cocoons, which look as well after being cured as those considered of the best quality. After getting the cocoons, they boggled at reeling. I have the approved Piedmont reel—we have tried to use it. After two attempts we have failed; and I shall now I fear, be obliged to send all our cocoons to the north, for them to derive the profits of our labor, as Virginia is obliged to do with all her rough materials. We have the Manual published by Congress, and understand, and can talk learnedly on all the principles—we can split hairs and make pleasing calculations, but want perseverance to do the work.

I think sir, you had better made an attempt to excite this sentiment among our young people. While you are trying to improve our lands, you must try and improve the people. I have scratched these lines hastily, and hope it will be in your power to impove them, and make them suitable to be published in your Register.

I am pleased with the first number of your Register, and shall do your all the good in my power to promote its circulation. AN OLD MAN.

The letter of our unknown correspondent needs no editorial "improvement," and we are pleased that he has made the desirable commencement of treating of small but useful matters in an easy and familia manner.

QUERIES CONCERNING FIELD PEAS.

To the Editor of the Farmers' Register.

I have wished to make field peas a regular crop in my rotation, with the view of profiting by their meliorating qualities—but I have been deterred by the ill success of my former attempts, though in truth, none of them were fair experiments. My anxiety on this subject has been increased by reading in your first number, the essay on "Rotation of Crops," and the remarks on field peas by "a Subscriber," (page 33.) I shall endeavor to make some careful experiments on peas next year, and if they be worth it, shall send your a report of the result for publication. In the mean time, I shall be obliged to any of those among your readers who are more experienced, to answer the following queries:

1. What is the supposed difference in expense and labor in cultivating, and securing when ripe the crops of corn and peas, each being planted alone, and on land equal to that of the other?

2. What is the usual comparative product of corn and peas, when planted separately, and also when growing (as is usual in some districts,) in alternate rows, in the same field? The kind of peas, and the time for planting them among growing corn, should be mentioned.

3. What is the supposed diminution of the corn crop caused by planting peas between the rows and can that loss be prevented entirely by the peas being planted late?

4. Has sowing peas broad-cast been found to be a safe and profitable practice, whether to obtain forage for stock, or, by being ploughed in, to improve the land for the succeeding crop of wheat?

N. T.

PLANTING IRISH POTOTOES.

From the Virginia Farmer.

Buckingham, May, 1833.

Mr. Editor:—I planted a piece of ground in Irish Potatoes, some of which I cut in pieces, leaving an eye to each; the others I planted whole. Those planted whole produced more than those cut, though the same quantity in weight was put in each hill.

D. C.

PRIZE ESSAY.

ON AGRICULTURE IN VIRGINIA.

By C. W. Gooch, of Henrico county.

From the Virginia Farmer.

It has fallen to the lot of the present race of mankind, to live in an age of improvement, unparalleled in the history of the world. The arts and sciences have been cultivated to a degree of perfection, and are developing results that had never entered into the imagination of the most sanguine enthusiast of any other period. The intellect and industry of man have made all nature subservient to his purposes. *Steam* has almost annihilated space; machinery has overcome most of the obstructions of nature, and promises to multiply, to an indefinite extent, articles of comfort and necessity. Revolutions in the moral and political, as well as physical condition of our species, strike the attention in whatever direction we turn our eyes.

But is it not remarkable, that, at such an era, we look in vain for corresponding improvements in *agriculture*, that first and noblest of human pursuits? In some of the old countries of Europe, surprising advances have been made. And, in several of the northern and eastern states of our confederation, the people have become sensible of the importance of the subject, and are in "the full tide of successful experiment" of an improved system of culture. If, in Virginia, we may congratulate ourselves, that several counties, neighborhoods, and detached individuals are following these examples, it is questionable whether they are not counterbalanced by the retrogading and desolate appearances that are so often met with in other parts of the state? Take the state altogether, it does not appear, to me, to improve at all; certainly, not *pari passu* with its population, morals or intelligence. For my own part, I cannot see how it should under such an accumulation of retarding causes.

The limits of such an essay as this, do not admit of a full discussion of these *causes*. Some of them will, however, be briefly adverted to, since a knowledge of them may be necessary to the proper application of remedies.

Ours is a new country, originally of great fertility. To account for its exhaustion, it will be necessary to look *back* to its settlement—leaving the intelligent reader to recollect many things which I must omit.

The country below the head of tide-water which now exhibits so many forests of young pines, and so many deserted fields of broomsedge and briers, was the first settled parts of the state, and bears more of the destroying works of man ence to more persons, and has been the hive whence than any other portion. It has also given subsistproceeded the great majority of the settlers in the middle and western parts of the state. It gave birth to, and raised more than double its proportion of that swarm of Virginians, who have peopled an empire in the west and southwest; and it still furnishes more than its ratio of the emigrants who cross the mountains. Its soil was exceedingly fertile when first stripped of the primeval forests. The aborigines exterminated the first settlers, and nobly warred against their successors. After the settlements were considered secure, and emigration from the mother country had increased nearly to inconvenient numbers, the exasperated Indians still kept them within narrow limits, and compelled them to cultivate their lands without rotation of crops or any ameliorating system. The settlements, nevertheless, progressed with the increase and wants of the population, driving the Indians before them. In this way parts of lower Virginia were nearly exhausted before the settlements reached the mountains. But, the tract of country above the head of tidewater, scarcely felt this Indian pressure; for, when the Indians were driven into the *hills*, and found the tide of white men rolling upon their retreating steps, they took refuge, at once, beyond the Blue Mountains. The advancing settlers then spread out and located themselves wherever they pleased. The laws permitted them to acquire ownership over land at the price of a few shillings per hundred acres. The policy of these laws was to encourage emigration from abroad, and people the country as rapidly as possible. In one respect, these laws had a pernicious effect on the agriculture of the state. They enabled the aristocracy, then numerous and wealthy, to locate and appropriate to themselves and their heirs, vast tracts of the most fertile lands, which, for several generations, were left uncleared, or were rented out to persons by whose unsparing cultivation they were the sooner impoverished. And, after, as well as before the revolution, it had a tendency to keep up an inequality among the people. May not too great a reduction in the price of the *public lands* now held by the *United States*, have a similar tendency, and cause a still stronger stream of emigrants to issue from the old states? This is an incidental question which cannot escape the solicitude of a Virginian at this moment. But it belongs to politics, with which this essay has but little connexion.

Of all the causes which have produced the present dilapidated appearance of Virginia and prevented agricultural improvements, the most operative have been the cultivation of tobacco, and the existence of slavery:—I mean *negro* slavery, in contra-distinction to *white* slavery! Whilst I shall speak freely of the disadvantages of the *one sort of slavery*, as coming within the proper sphere of my remarks, I cannot feel authorized to go out of my way to comment on the other. All that I ask is, that improper inferences may not be drawn.

It is probable that seven-tenths of the land that has been cleared east of the mountains, has undergone the scourge of the tobacco crop. Tobacco has been the staple of Virginia from its settlement. Its culture was greatly encouraged by English and colonial legislation, and has not lost its importance on the statute book of later times. Formerly, it was a sort of cash medium of remittance to the mother country, and a circulating currency among our citizens. The *Inspector's notes* passed as readily as do the bank notes of the present day; and individuals gave their bonds for tobacco, as often as for money. The exhausting effects of its culture, arise as well from its heavy drafts upon the soil, for the juices which contribute to its size and weight, and its oily narcotic qualities, as from the necessary process of tillage. The land is stript of every thing down to the cover of decaying leaves—the rich vegetable mould, that had been accumulating for centuries, is then scraped up into hills, mixed with a portion of the soil from below. For many years past, previous, coultering has been found necessary in consequence of the injury done, and compactness given to the soil, by the long

trampling of domestic animals. This mould, thus suddenly exposed to the atmosphere, the rain and the sun, is soon evaporated, or washed into the vallies. Being soluble in a great degree, its evaporation is, in my opinion, as great as its consumption in every other way; for it rarely washes off under the tobacco crop except from steep hill sides. The elevation of the tobacco hills causes them, before shaded by heavy plants, to dry quickly both by sun and wind. To this we may add the frequent stirring of the ground when the plant is young, by the process of weeding and hilling up.

Here, by way of digression, I must be excused for a few remarks which would seem to have a more appropriate place elsewhere. But, as they apply to this mould—this young and tenderest part of all soils, I insert them in this place.

The vegetable mould found on the top of all virgin land, varies in thickness, according to circumstances. But these circumstances involve a philosophical inquiry, into which the limits of a fugitive essay do not permit me to enter. Why is it, that the leaves of the forest so rapidly decay in the rich woodlands of the western country, and that they are covered with grass? Is not this the case sometimes, in the forests of Virginia? Why do the leaves of the walnut, and some other trees, decompose so rapidly in all situations? and why is the ground about them richer than that adjacent? The mould on the top of new land ought never to be broken up and *exposed*, if it can be avoided. On the contrary, it ought to be turned under and mixed with the under soil. This process will be a little difficult in new ground. But the benefits resulting from the mixture and fermentation, will more than compensate for the trouble. I would recommend that such land be prepared as well as possible, and planted in corn, without destroying the cover of leaves by the barbarous and common practice of raking and *burning*. Corn is a vigorous plant, and with the aid of hoe work, will be greatly benefitted by the half decayed twigs, leaves and wood, which cover our virgin land. Neither wheat nor tobacco will grow so well amidst the trash of a new ground. The working will intermix the whole mass of litter with the mould and a small part of the next stratum. And thus, when the corn crop comes off, the previous stirring and amalgamation of the mould, leaves, twigs, rotten wood, and a part of the sub-soil, will be a preparation for after crops. It is true, that the greater, the quantity of litter, the less corn will the land yield. If we could spread lime, or marl, or, even the more common article of plaster, upon it, before coultering and working, the corn crop would be relieved from its pale-green, sickly appearance and give more grain, and that riper. The frosts of the next winter will prepare this land for a crop of tobacco, or small grain. If the soil be good and the owner wishes to make tobacco, he will get more the next year, and even the year following, than he could have made the first year after the old plan of *raking and burning*. We have sought, as our ancestors did, every mode of destroying the vegetable mould upon our lands, and of the materials out of which it is produced. My idea is, that with a *farmer*, or even the tabacco maker, who has lots or flats, it would be best to put this new land, managed as I have described, in small grain the second year, followed up by clover and plaster the third and fourth years. After this, it will have yielded him a fair return, be richer than when cleared, and be capable of producing a good crop of any thing he may wish to cultivate. And it may be, progressively, improved by a proper rotation, if there be a clay foundation: if not, it can be *kept productive*, and comparatively rich. The chief difficulty in reclaiming exhausted land, arises from the absence of putrescent vegetable matter, which it originally contained, and which has been destroyed by severe cropping, bad tillage, and close grazing. It is in vain that nature annually attempts to renew this essential food of plants, when the rapacity of man and beast unite to defeat her efforts. But to proceed.

Tobacco leaves but little offal or manure; and it comes off the ground so late in the fall, that no sheltering or improving after crop follows it. No crop remains so long on the hands of the cultivator or requires such constant and fatiguing labor. It is generally from twelve to eighteen months from the sowing of the seed to its arrival at market. All this time it requires constant attention, if not the constant application of labor. The planter formerly relied upon it as his only source of income; for he seldom made corn for sale, and often less than he wanted; and the wheat crop went to make up deficiencies, pay taxes, &c. In this respect there has been a favorable change within the recollection of the writer. Woodlands adapted to tobacco have now become scarce, and it is, chiefly raised on manured lots, and rich flats. Necessity has thus driven the planters to the new practice of taking care of manure; but they devote nearly all of it to their tobacco lots. More attention is now paid to grain crops than formerly. The three-shift system is the one commonly pursued, by which each field is improperly said to *rest* one year in three; but under the kind attention and constant presence of all the four-footed animals on the farm. It however, gets a little respite after harvest, when the stock are turned into the grain fields to glean them, and destroy the young after-growth of weeds and grass which provident nature throws up as a protection from the sun; and as a fresh supply of vegetable matter to sustain the growth of the next year. In the rotation of crops, she sets us a beautiful example.—Look to the various productions she sends forth on new land; and especially when we destroy each production. The next is always different from the immediately preceding one. This land-destroying, Virginia system of husbandry, has been practised by almost the whole community until within a few years, and a majority of our people still pursue it. And is to be wondered at, that after the destruction of so much of the soil by tobacco, and such long perseverance in this system, our lands wear out and yield such scanty returns for the labor of the husbandman?

If you examine the plantation of the tobacco maker you find every appearance of poverty or unpardonable neglect. The owner will acknowledge that things ought to be and might be better; but that he has no time to spare, owing to the pressure of his crops, particularly his tobacco crop, which interferes with all his other operations throughout the whole year. There is much truth in his excuses; for in January, February, and March, he is clearing new grounds; preparing and burning plant-beds; fencing; manuring, and fal-

lowing tobacco lots; sowing oats, ploughing, and preparing corn land; and either stripping or prizing tobacco; perhaps both. In April, May and June, his toils begin to assume more interest, and require more exertion; his whole crop of corn is to plant, replant, thin, weed and cultivate; the tobacco hills are to be made, turned, cut off, and the first plantings made. The old crop of tobacco is yet to be finished prizing, and hauled to market if not proviously done; experience having proven that the longer it is kept before prizing, the sounder and better cured it will be—especially for shipping. Harvest is now at hand; but that period of industry and festivity to the mere farmer, brings with it sleepless toil and accumulated cares to the planter. The replanting tobacco, the topping of that which stood well, and the most careful tillage of the whole with the hand-hoe, press him on the one hand; whilst on the other, his late corn is not yet laid by, and his grain requires cutting. From the pressure of the corn and tobacco, the grain is too often literally mowed down and shocked about the field in a still more hurried and slovenly manner, to be half destroyed by winds and rains.—Throughout the months of July, August and September, not a moment's respite is enjoyed. The tobacco crop has to be gone over more than a dozen times in the laborious operations of topping, succoring, worming, working, cutting, hilling, removing to the houses and curing. The small grain must be hauled up and stacked, and when the depredations of the wevil leave *no other alternative*, the wheat is gotten out and carried to market. The fodder soon has to be secured, and this comes on just with the cutting of tobacco. During the other three months of the year, the better securing of the fodder, the gathering and housing of the corn, and the sowing of the next year's crop of winter grain, leave no leisure time to the poor planter. The tobacco, although housed, must be closely watched; the latter cuttings cured; and then commence the tedious operations of striking, stripping, assorting and bulking away. Besides these conflicting objects of attention, there are many others that demand the care and attention of the planter. The whole circle of the year is one scene of bustle and toil, in which tobacco claims a constant and chief share. No time can be devoted to the planting of fruit and ornamental trees—to ditching—cleaning up waste and reclaiming galled spots—making and spreading manure on the grain fields—deep and careful ploughing—sowing clover and plaster—or providing comfortable shelters for stock in the winter. The dwelling house, yard and garden enclosures, and all the out buildings, too often fall into decay for the want of some trifling repairs, which the crop hands might make *if they* had time. The plantation soon looks tattered and almost desolate—galled and gullied hillsides and sedgy, briery fields show themselves in every direction. The profits from the destruction of one plantation, are applied to the purchase of another and of more negroes. The new one is put in charge of an overseer *on shares*, who soon brings it to greater sterility and desolation. It is in this way that most of the best lands in Virginia have been brought to their present condition, and have been, then, deserted by the destroyers.

But the existence of negro slavery among us, has in a great degree, influenced the mode of destroying our lands, and hastened its accomplishment. In former times the exactions of the master were only limited by his cupidity. In this respect, a favorable change has taken place. Our slaves are now as well fed and clothed, and enjoy as many comforts as the laboring class in other countries; and they have improved proportionably in their appearance and intelligence. It is not my purpose to touch the dark question which involves their future destiny. Its agitation has, already, on two occasions, roused a state of feeling which verged to desperate extremes. Whatever evils may attend it, the *right of property* can never be permitted to be questioned by others.

The possession of slaves has had too great a tendency to make the owner and his family unwilling to take upon themselves any part of the drudgery of out-door business; and too many of our people think it disreputable to labor. We have been accustomed to be waited upon from our infancy, and consequently, keep about us too many wasteful and almost idle domestics. Exempted from labor and even from the common cares of business by the employment of agents we imbibe habits and modes of thinking unfavorable to physical improvement or successful agriculture. The unfinished houses, and *projects* half executed, which are to be seen throughout the state, are evidences of the meaning and truth of this remark. That the ease in which we have so long indulged, favors the attainment of literary and political knowledge and personal accomplishments is manifest from the acknowledged proficiency of Virginians in *these respects*. But, whilst we are all politicians, to a man, it is to be regretted that our achievements in the arts and sciences bear no just proportion to the opportunities we have had. May not this arise from the ill-judged devotion of too much time to pleasure and dissipation? It is unfashionable for a genteel or educatod Virginian to apply himself to the details and cares of the humble, but useful vocations of life. And hence it is, that most of the sprightliness and genius of the state have been applied to one of the two learned professions. The pulpit is, of late, putting in its claim to the aspirations of our youth. Has not agriculture and the arts been too long robbed in this way, of their just share of talents—of men whose intellectual endowments might have given a more winning countenance to the venerated mother of us all? Of the legions of young men who annually embark in the professions, how many are there who rise to eminence? How many that, from disappointment and chagrine, betake themselves to dissipation? How many linger out a brief life of listlessness and *expectation*; almost a burden to themselves and an expense to their parents and relations? How many, with consciousness of merit and a determination not to become drones, reluctantly emigrate from the scenes of their boyhood and the bones of their ancestors? May not I ask, what portion of all these, if brought up to the habits and cares of business—to the quiet and healthful pursuits of rural life—or to the cultivation of the useful arts, would have been lost to the state either by self-destroying, habits or emigration? The effects of slavery upon our daughters, though not less striking and pernicious, are less seriously felt by *agriculture*; but it does not seem to accord with the object of this paper, to dwell upon them. If these effects be seen in the lofty pride of our women, in their admiration of genius, intellect and valor,

and a *repugnance to domestic duties*, they are also to be seen in their virtues, and especially in their chastity. The profligate cannot fail to see and feel the meaning of this remark.

The white man who has to labor for his support does it with an unwilling spirit. He sees the exemption enjoyed by others; and, if he does not fancy himself equally entitled to it, is too apt to repine at his lot, or migrate to some new state where he will be upon a footing of greater equality with his neighbors.

But, independent of the enervating and paralyzing effects of slavery upon all our *white population*, there are pecuniary losses arising from it, that are heavy drawbacks to the agriculturist.—Most of the labors of agriculture have been confided to careless overseers, and still more careless operators. The slave feels no inducement to execute his work with effect. He has a peculiar art of slighting it, and seeming to be busy, when in fact, he is doing little or nothing. Nor can he be made to take proper care of stock, tools, or any thing else. He will rarely take care of his clothes or his own health, much less of his companions, when sick and requiring his aid and kindness. There is, perhaps, not in nature, a more heedless thoughtless human being, than a Virginia field negro. With no care upon his mind, with warm clothing and plenty of food, under a good master he is far the happier man of the two. His maxim is, "Come day, go day, God send Sunday." His abhorrence of the poor white man is very great. He may, sometimes, feel a *reflected* respect for him, in consequence of the confidence and esteem of his master and others. But this trait is as remarkable in the white as in the black man. All despise poverty, and seem to worship wealth. To the losses which arise from the *disposition* of our slaves must be added those which are occasioned by their *habits*. There seems to be almost an entire absence of moral principle among the mass of our colored population. But details upon this subject would be here misplaced. To steal and not be detected, is a merit among them; as it was with certain people in ancient times, and is, at this day, with some unenlightened portions of mankind.—And the vice which they hold in the greatest abhorrence, is that of telling upon one another.—There are many exceptions, it is true; though this description embraces more than the majority. The numerous free negroes, and worthless, dissipated whites, who have no visible means of support, and who are rarely seen at work, derive their chief subsistence from the thefts of the slaves. These thefts amount to a great deal in the course of the year, and operate like leeches on the fair income of agriculture. They vary, however, in every county and neighborhood, in the exact proportion as the markets for the plunder varies. In the vicinities of towns and villages, they are the most serious. Besides the actual loss of property occasioned by them, they involve the riding of our horses at night, the corruption of the habits and the injury of the health of the slaves; for whiskey is the price generally received for them. These evils have been always felt; but they have become so great of late, that the legislature ought to provide a more efficient remedy. The statute book would *seem* to contain one. "Whether the defect be in the law or in its execution," is not for me to decide. It sometimes happens that the head thief on a farm is in partnership with the overseer; and when this is the case, the husbandman has no chance for profit.

Another great cause of the dilapidated appearance of Virginia, is the semi-annual wave of emigration, which has so long rolled from her bosom in a western and southwestern direction. It has not only swept off the most enterprising portion of our people, but also much of the capital and moveable property of the state. Nor is this all, the price of land has been kept down by the great quantities of it brought into market by the emigrants. Instead of improving those we held before, we have been tempted to add to our possessions exhausted farms and plantations. It has been the custom to go in debt for two thirds of such purchases. The emigrants, besides taking with them every thing they can, draw, annually, for three years, upon the earnings of their old neighbors. Thus, the land-holders have not been able to accumulate a *disposable* cash fund, to be applied to improvements and the purchase of better implements, &c. On the contrary, they are too often forced to cultivate their lands with greater severity, to meet these payments.

The great fertility and cheapness of western lands, and the increased value given of late, to every thing in the west, by the use of steam on its noble rivers, have been inducements to emigration too strong to be resisted by a people who find it laborious to earn a mere subsistence in the land of their fathers. I need but advert to the wonderful the magic growth of the "mighty west"—that fairy land of imagined manna, and of milk, and honey. During the ten years, from 1820 to 1830 the increase of population, and rate of increase, will be seen from the following table:

States.	Increase in ten years.	Rate of increase per ct. in 10 yrs.	Present population.
Alabama,	181,096	141.6	308,997
Mississippi,	61,358	80.1	136,806
Tennessee,	264,009	62.7	684,822
Kentucky,	124,527	22.1	688,844
Ohio,	356,203	61.2	937,679
Indiana,	194,404	132.1	341,582
Illinois,	102,364	185.4	157,575
Missouri,	73,488	110.4	140,074
	1,357,449	avr. 99.4	3,396,379

These rich and flourishing states have grown up within a short time. It is not pretended that all the emigrants by whom they have been peopled went from Virginia. But it must be conceded that this state furnished a very large proportion of them, to say nothing of the number of her sons who migrated to the Carolinas, Georgia, Florida, Louisiana, Texas, Arkansas, and Michigan. The fact that so many of our friends and relations have left us and are prosperous and happy in the new states, has a tendency to make us restless and dissatisfied, and will continue to keep up, and perhaps, increase the spirit of emigration.

I have given a rapid sketch of some of the great causes of the depressed condition of Virginia, and particularly of her agriculture. But there are many others, some growing out of these, and others independent of them, which I must leave to suggest themselves to the mind of the intelligent reader.

Now; what is to be done to arrest these evils

to give new hope and confidence to the desponding minds of our citizens, and retrieve the falling fortunes of the good old *mother state?* This question addresses itself to the heart of every individual patriot—it solemnly appeals to the hearts and the heads of our *legislators* and all others *in authority* among us. The thing is practicable; and only requires a small sacrifice of pride, individual interest and local feeling. Let us abandon and discountenance that aristocratic feeling which we have inherited from our ancestors, and have too long cherished—Let us attend more in person to our business no matter what that may be, instead of trusting to agents or deputies—retrench expenditures, particularly of living—bring up fewer of our sons to the learned professions, and more of them to industry in agricultural and the useful trades and arts. In this way we may dispense with many careless and costly overseers, with the number of artists, engineers, skilful mechanics, and even with the hosts of northern schoolmasters who find annual employment alongside of our *idle sons.* Let us abandon the besetting sin of procrastination and making good resolutions that are never executed—adopt an improved system of cultivation—make all the manure we can and reclaim a given number of acres of land every year, according to our means, if it be but one or two—use better implements of husbandry—prepare for it and take better care of our crops and stock—reduce the latter to a number that can be well fed and kept in high order, and one fourth will give more profit than the whole, and as much manure, without extensive and ruinous grazing of the fields. Ought we not, as soon as possible, get the best breeds of stock; and, gradually, adopt the *soiling* system; or, in other words, the plan of keeping our stock within limited bounds, and *feeding* them abundantly with food, cultivated and prepared for them, throughout the various seasons the year? One milch cow properly housed and fed throughout the winter, will give to a family more milk than half a dozen in our common way. But experiments and their results upon this, and almost all the branches of rural economy, have been made known to the public, and may be referred to. The nature of this article prevents my going into specific details; since almost every subject would be the ample groundwork of a little volume.

But, why should we not get up agricultural societies in different parts of the state, and *keep them up,* by zealously encountering some little trouble and expense for that purpose? It is an old saying, that "what is every body's business is nobody's." This aphorism *is not true in politics.* And, why is it, that we cannot feel a kindred zeal in what is the foundation and life-spring of all other human vocations? In politics every man takes an interest—We are ready to attend public meetings—to discuss the topics of the day around our fire sides, at cross roads, and all the sorts of *shops* and meeting places in every county. We cheerfully pay our money to support profligate and hired editors, who either gratify our taste for slander, or minister to our bitter prejudices. And, yet, we are unwilling to pay a small sum for the support of an agricultural journal, or an agricultural society! Our civil and political rights are very important. But, there are "matters and things" which address themselves to our next dearest, sublunary interests, and which we ought to attend to; because they involve so large a portion of our comfort prosperity and happiness. The human race is struggling to get *onward,* in almost every thing else, but in the homely pursuit on which all others depend—*agricultural*—yes, every thing depends upon it at last; for it supplies the substantial comforts of life. What a host of men have we in this half-peopled word of *ours,* where there is so much land and such ample elbow-room, who literally *live* upon the industry of the husbandman? It is true that many of them are necessary auxiliaries. But how many of the various *craftsmen,* including the *battern* and *shuttle,* and other *players*; whether in the forum; the sick room; the pulpit; the necessary departments of public service; in the various and ramified employments of commerce; or in the circles of benevolent societies and other trades devoted to our *instruction and edification*—how many, I ask, among all these, are willing to walk upon *old mother earth,* during half the year, without double and trible *foot-clothing!* many of them afford us necessary comforts and conveniences, and even the pretty things upon which we may serve up in style, the productions of the husbandman; and, others live by their talent for offering up to Heaven fervent thanks for the privilege extended to all, of *consuming* these savory viands. But, after all, do not the varied and indispensable vocations of human intellect and human industry mainly depend upon the *agricultural* community? Upon that portion of our population, the least respected, and the least regarded by the law makers, and the patrons of other and less valuable pursuits?

Is not husbandry the great preponderating interest in America? Look at the happy varieties of our soil, climate and productions—look at the vast territory of unimproved and uncultivated land inviting the hand of industry, and promising the *slow,* but *certain* rewards of peace, health, abundance. And with all these things staring us in the face, is it not preposterous in the federal government to wish to hurry things beyond their natural gait—to turn us into a nation of *spinners* and *weavers,* and *handicraftsmen!* The talents of the state have been too much devoted to something other than our *primary* interest; and that is the reason, as I have before suggested, that Virginia has sunk to what she is. Is not the time for her renovation at hand?—Many of us have been unwilling to *run away,* either from the increasing gloom and dilapidation, which annually thicken around us; or from the moral depreciation, including our own faults, in which we find ourselves annually involved. I say that *many* have been influenced by this consideration—we have expected a sense of returning justice on the part of the federal and state governments—we have looked to better times, and suffered present evils, under the confident expectation, that, justice would be done to us by the federal government, in relation to the tariff, &c.; and that, our own drones in the state legislature would be either removed, or awakened to a sense of their obligations to do something for the farmers and planters; instead of spending their time in abstractions about federal politics, or catering for the interests of deputy sheriffs and clerks of courts. This remark, so far as federal politics are concerned at *this time,* may not be strictly just; for, I acknowledge that South Carolina has placed the union in jeopardy. But, my essay has nothing to do with that.

If the farmers and planters of the United States choose to be made the pack horses on which all other interests may ride up the hill of prosperity—be it so, in the name of God! We have broad shoulders—brawny hands; and very little ambition, but to surpass the ban-box, and handicraft, and tongue-craft gentry in all the substantials of honest dealing and warm-hearted, though blunt, hospitality. I am exclusively a farmer; yet, I have seen something beyond the scope of rural cares and country rusticity. And may I not ask, after all, who, in the whole circle of human employments, enjoys more substantial happiness and feels a loftier independence than the virtuous warm-hearted *husbandman*? All that surrounds him is his, and, depends upon him. Every thing that he consumes is the product of his own industry, except a few luxuries, which he readily procures in exchange for his surplus articles or for the price of them. His necessary exercise in the pure air invigorates both body and mind. Who eats his meals with more zest, or sleeps sounder? Who is less annoyed with ennui—with *dyspepsia*—with other *fashionable* diseases? Who enjoys the company of a friend or neighbor with more heart-felt pleasure—or is more willing to offer the hospitalities of his roof to the stranger?

But why should not the husbandman, with these pre-eminent claims, receive some share of justice from the government? Some little crumb of comfort—and if not even a *crumb*, why should he not be *exempted* from the maintenance of speculation, cupidity and avarice? We have no hope but in ourselves. Let us then determine upon a change. We cannot be worsted much. Why should we not instruct our Burgesses to make more ample provision for educating the people, and for carrying on a system of internal improvement commensurate with the wants and the rich resources of the state?—These subjects are intimately connected with the prosperity of agriculture. I will not insult the public understanding by supposing that any thing is necessary to be said in behalf of education. The only difficulty is, that the men of property are too unwilling to pay a small tax to enlighten the minds of the children of their poorer neighbors. They seem to have forgotten that the law of entails is abolished; and that in the revolutions of fortune their own children and grandchildren may stand in need of a similar mite from the very persons whom they seem now so unwilling to aid. They also seem not to perceive that by some trifling contribution they may dispel some of the clouds of ignorance by which they are surrounded, and improve the morals and habits of their neighbors.

A judicious system of *internal improvement* projected upon a liberal scale, and prosecuted with adequate means and becoming energy, cannot fail to put a new face upon the affairs of the whole state. In its prosecution it must increase the value of labor and give employment to the restless part of our population; giving, at the same time, fresh expectations and hopes to all desponding minds. If it does not at once arrest the destroying tide of emigration it cannot fail to do it in a few years. Need I dwell upon the rich and varied resources of this great state?—resources which would be soon developed, if the means of transportation and intercommunication were only afforded? In consequence of the great expense of transportation to market, the production, of the interior are confined to such articles as will bear the expense. But if we had the necessary roads and canals, an immediate change would take place in the pursuit of the planters and farmers. Their industry and economy would be stimulated, and cause the production of a variety of articles which would add new wealth to the state, new comforts to the producers, and materially change the blighted aspect of the country. There is nothing to be alarmed at in the expense of a well planned road or canal although the amount may at first seem to be large; for the income will soon pay it off. In the mean time, the advantages to be derived from the increase in the value of property, the new articles that may be carried to market, and the saving in the expense of carriage, will all more than compensate for the cost of the work. But it is the misfortune of Virginia, that on this, as on many other subjects, her local interests are not homogeneous. We have a lowland, a south-side, a middle, a valley, a northwestern and southwestern interest. Some of these either in the whole or in part, harmonize on improvements. But has not the time arrived when these jealousies and conflicting pretensions should give way to the common good? It is impossible to undertake at once, all the needed improvements in every section of the state. Ought they not to be executed, if the state is to participate as she ought, according to the scale of their value and importance; if local feeling and contrariety of views in the legislature disqualify that body from arranging the order in which such improvements ought to be made, what objection can there be, to the employment of commissioners and engineers from other states, to fix the scale of importance and order of time for their construction?

It is due to candor to acknowledge that no part of the state has received less public bounty in the way of improvement than the country below the head of tidewater, whilst they have contributed their full share to the internal improvement fund. But, prospectively, they are deeply interested in the improvement of the whole state. Altho' they have level roads and navigable waters, there is scarcely a county in lower Virginia, in which some valuable improvement may not be made, fully equal to its share of general contribution. Justice would seem to require that these should not be overlooked. But, to return from this digression.

The defects of our police laws; the complication of our whole code; and, especially, the vexations and expensive delays of litigation bear upon all classes of productive industry, for the benefit of the nonproducers and inefficients.

It was not my intention in the commencement of this paper, to dwell on the several crops cultivated in Virginia; or on the best modes of tilling each. Such a range of inquiry is beyond my ability; and, if it were not, it would require a ponderous volume to embrace it. We must recollect that our state is divided into three great territorial divisions, in each of which the staples, the soil, and the climate, differ essentially. Below the head of tidewater, corn, cotton, oats, peas, potatoes, &c. are the chief objects of culture; above the head of tidewater and to the north mountain, tobacco and wheat; and, in the valley, may be added hemp, live stock, &c. Beyond the north

mountain, grazing, and fattening stock for market may be considered as the preponderating interest. Systems of tillage and management, quite different in many respects, apply to each portion of the state. The single subject of the management of *manure*, both in regard to the making and application of it, presents an illustration of my idea. In the lower country, we have an abundance of shell-marl, sea, swamp, creek and river mud; pine beards, kelp, and exhaustless quantities of vegetable matter on the swamps and marshes; we only want the industry to collect and use them. The newly discovered quantity and value of our marl resources seem to favor the hope, that, from this source alone, a marked change will soon take place in the appearance of this most tattered, and desolate-looking portion of Virginia. Albemarle is the native county of the writer; yet, he is not blind to the beauties, the advantages and value of lower Virginia.—Its great misfortune has been, the facility with whicn a subsistence could be procured, without much labor. The palatable productions of the air, the land, and the water, have too much enervated, may I not say, paralyzed, the energies of the people. At one time the monopoly of property and the proud aristocratic feeling of the Dons, kept every thing subservient to them; and, to them, and their pride, and anti-republicanism, lower Virginia is more indebted for her drooping appearance, both in the general aspect of the country, and the *general mind*, than to any thing else! The effects of *emigration* would not have been so serious in lower Virginia, *but* for the pride of "*untitled nobility*." Thank God, that there is now some hope for a change! The revolutions of fortune have left but few of the *old gentry* who are not, more or less, disposed to mingle without conscious disgrace, among the *common people*; and, always when they want office or public favor. And those who do remain, of that caste, whilst they may justly feel the pride of *pedigree*, must feel also a conviction, that there ancestors have a little overstepped the mark, on this subject. But, things are getting right; and, it is unseemly to talk too much about a *departing shade!* We ought to let it pass because we have more recent, and now more formidable pretensions to combat.

The other parts of the state are less amply supplied by nature with materials that may be employed in fertilizing the soil. From the operation of this remark, ought to be exempted all that region of country in which *limestone* is found in abundance. This exemption, would embrace a large and, perhaps, the most desirable portion of country, beyond the Blue Ridge. In that section of the state the abundance of limestone and calcareous earth or marl, leave those who reside among these advantages, no excuse for not enriching their land. A narrow vein of limestone commences at the Potomac on the east of the Ridge, and runs parallel to the mountain at about an average distance of twenty-five miles from it, quite to the North Carolina line. This vein, is, in many places, a considerable depth below the surface. But where it does appear is of good quality and might be usefully employed in fertilizing the adjacent lands. In the line of this vein, the writer has seen immense quantities of blue clay marl, resembling limestone, in the water-courses, and where the top soil has been washed off on hill sides. This substance is of the consistency of Fuller's earth; but effervesces powerfully in acids. When applied as a manure he has seen the most surprising results. And, yet is it not strange, that neither this substance nor the limestone, is any where used to much extent? The marl of the lower country is becoming an article of commerce. It is most abundant on the navigable rivers and bays, and vessels have been some time employed in transporting it to the cities north of us, where it sells from 10 to 12½ cents, per bushel.

We have too long trod in the old and beaten track of our ancestors. Has not the time arrived when the agricultural community ought to rouse from this lethargy—avail themselves of the wonderful improvements of the age—at any rate show a disposition to avail themselves of all new discoveries, and to better their condition? Why should we permit every thing else to get so far the start of us? Our neighbors to the north, and even to the west deride and shame us, by their superior skill and industry, and the consequent superior advantages and comforts they enjoy! Then, let us "be up and adoing." We have the climate, the soil and other superior advantages that a kind Providence has bestowed upon us. We have every thing necessary for the exhibition of enviable scenes of rural beauty, prosperity, and happiness yes, every thing but the *industry*—and a *disposition* to do so. How long will we submit to such a just reproach!!

For the Farmers' Register.

Pedigrees of the Durham bull PATRICAN, Durham cow SACCHARISSA, and Herefordshire bull YOUNG TROJAN, imported by Corbin Warwick, Esq. of Richmond.

[It affords us much gratification to publish the account of this importation of fine cattle, and to present the following testimonials of their value, founded on their descent from stock possessing qualities of the highest grade. It is fortunate for the country, when the expenditure of its wealthy citizens take directions of this kind. Even if the individual sustains loss, (as unfortunately has happened to most of the experimenters who have labored successfully for the benefit of mankind,) at least the public welfare is essentially promoted. But we hope that in the present case, the public-spirited effort made to improve our breed of cattle, will prove as profitable to Mr. Warwick, as we believe it will be to the country at large.—[*Ed. Far. Reg.*]

Yearling short horned Durham Bull PATRICIAN, got by Martin*, dam by Wharfdale, grand dam Prima by Mentor, g. g. dam Pretty Lass by Harold, g. g. g. dam Pretty Maid by Charge's Duke; g. g. g. g. d. by Charge's grey Bull, &c. &c. in a direct line to the Studley Bull.

*Martin by Belzoni†, dam Rosanne by North Star—Surprize by Major—Red Rose by Yarborough—the American Cow (sister to R. Collins' Red Rose) by Favorite—Punch—Foljambe—Hubback—James Brown's old Red Bull.

†Belzoni by North Star, dam Cleopatra, by Lancaster. (sold in R. Collins' sale for £500,) g. d. by George—Favorite (Comet's sire)—Punch.

Yearling short horned Durham Heifer SACCHARISSA, got by Martin, dam Seraphina by Wharfdale, g. d. by Palemon, g. g. d. Prodigy by Meteor, g. g. g. d. Princess by Western Comet, g. g. g. g. d. Selina, (sold in C. Collins' sale for £200,) by Favorite, g. g. g. g. g. d. Countess (sold at same time for £400,) by Cupid, g. g. g. g. g. g. d. Lady (sold at the same time, 14 years old, for £200,) by grand son of Bolingbroke, g.

g. g. g. g. g. g. d. Phœnix the grand dam of Comet, sold in Collins' sale for 1000 guineas.

P. S. The Heifer is in calf by Maggot. Maggot was got by Martin. dam Minx, (winner of the 16 guineas sweepstake for yearlings at Tredegar, Minx by Wharfdale, g. d. Unima, by Nestor, g. g. d. Minerva, (winner of the premium at Warcester for best heifer, in milk) g. g. g. d. Mary by Meteor, g. g. g. g. d. Magdalena (bred by C. Collins, and a 14 quart cow) by Comet, g. g. g. g. g. d. by Cupid.

The foregoing are correct pedigrees of the cattle above named; and will be found on reference to Coates' Herd Book and Supplement.

[Signed] HENRY BERRY,
Great Dinham, near Chepstow, Monmouthshire.

Yearling Herefordshire, Bull, YOUNG TROJAN, got by a son of the celebrated bull Stockton, that was bred by Mr. Wayman, late of Moreton Court, who challenged to show him against any Hereford bull in England; his dam by a bull bred by Mr. Yarworth, late of Brinsop Court, which bull was by Old Trojan, out of his favorite cow Old Curley, a pure bred Tuiley cow.

[Signed] JNO. TURNER, *near Leominster.*

TO CORRESPONDENTS AND READERS.

The *Account of the Embankment and Cultivation of the Shirley Swamp*, and the communication on the *Four-Shift System, &c.* were received too late for either to be inserted entire in this number of the Farmers' Register: and we wish to avoid injuring any article by dividing it between different numbers. Both these will appear in No. 3.

The *New Method of Cultivating Asparagus—Experiments and Observations on Putrescent Manures* and *Queries on Sassafras*, which have also been necessarily postponed, will form part of No. 3. Our contributors will oblige us, and will generally avoid such delays, by sending their communications as early in each month as may be convenient.

All subscribers who have received extra copies of No. 1, are requested to return them to the printer, unless they can oblige us still more, by using such copies to supply directly other new subscribers, or otherwise extending the circulation of the work.

As the Farmers' Register is debarred by law from the privilege which newspapers have, of exchanging publications free of postage, that consideration added to others, will prohibit our making exchanges except with such agricultural or other journals as are devoted to the subjects proposed for this work.

We have been highly and unexpectedly gratified by the more than kind welcome with which the appearance of our first number has been greeted by our friends and the public. Especially are we indebted to our editorial brethren for their many and high enconiums, for which we are not the less grateful, because conscious that they are undeserved. We can only answer to the numerous testimonials of this kind, private as well as public, and from strangers no less than from friends, that we will endeavor, as much as possible, to make up by zeal and labor for our deficiency in talents of higher order, for the possession of which our reputation is indebted far more to the favor of others, than to our own merit.

But while we offer thanks, without discrimination, to all who have thus aided to encourage and sustain our first efforts, it is our duty to refer more particularly to one marked favor of this kind, from a fellow laborer and predecessor in the cause we aim to support. We allude to the remarks of the Editor of the *Virginia Farmer*, which we here republish, because however complimentary to us, they reflect still more honor on their author. We cannot by our expressions do justice to the disinterested and liberal course of our respected brother editor, which is indirectly, yet strongly exhibited in his comments on the Farmers' Register: and however anxious for our own success, it will be a cause to us for sincere regret, if loss to him should be thereby produced. The cause of agriculture owes much to the public spirited efforts of the editor of the 'Virginia Farmer,' and we earnestly hope that in no event will he be permitted to incur loss from such praiseworthy and honorable exertions. If he has not received, he has well deserved the rewards of success.

From the Virginia Farmer.

"FARMERS' REGISTER.—We have just received this excellent publication. We had been long anxiously expecting it, and we must confess ourselves gratified at the very flattering commencement which its intelligent editor, Mr. Ruffin, has made. Perhaps Virginia could not find one better qualified to conduct a paper of this sort than Mr. Ruffin. But his character, as a discriminating investigator of all subjects relating to agriculture, requires no comment from us. His valuable and scientific work on calcareous manures, has long been before the public, and is a sufficient test of his ability.

"The first number of the 'Farmers' Register' contains much valuable matter, of which, however, we need not here speak.

"We are fully aware of the fact, that our humble and unpretending production, the 'Virginia Farmer' stands against 'fearful odds.' We know that it must droop like the harebell before the sun, when compared with this excellent publication. But we are candid when we say, that if there is not sufficient patronage with the public for both of us, we are willing to succumb in so noble a combat. We will willingly give way, (if so we must,) to a publication calculated to do so much good. We scorn the little petty jealousies with which some might be actuated under similar circumstances.

"Whatever may be the fate of the Virginia Farmer, we will vouch for one fact—our zeal in the cause and our exertions to make it useful, have been untiring.

"By active exertions we have been able to call to our humble columns, some of the best agricultural writers in Virginia. The article which the lamented Mr. Meade furnished us on agricultural education, was excellent. 'The Fireside Reflections of a Buckingham Farmer,' and various excellent communications from Buckingham and Fluvanna, which we could mention, have been read with interest, and we hope with profit. And the essay in our present number, [Prize Essay on Agriculture in Virginia,] we know will commend itself to every reader.

"Every man is entitled to his due, and we may at least lay claim to the credit of sending forth the pioneer in the cause of decaying agriculture in Virginia, and if it falls in the onset, be its motto this:

'Sparta has nobler sons than he.'"

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